PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Airline	WG-4011A, B, WG-4012A, B, WG-4111A, B, C, WG-4112A, B, C, WG-5011A, B, WG-5014A, B, WG-5016A, WG-5018A, WG-5111A, B, C, WG-5114A, B, C, WG-5116A, WG-5118A (Code 21A59CT) Tel. Rec.	313-2
Crescent	604	313-3
Emerson	700B, L, 701B, 714B, D, 715D (Ch. 120153B, D) Tel. Rec. Prod. Chg. Bul. 151	313-1
General Electric	17T21, 17T22, 21C106, 21C107, 21C109, 21T32, 21T33, 21T35, 21T36, 21T37 ("N" Line) Tel. Rec., Prod. Chg. Bul. 151	313-1
General Electric	21C110, 111, 112, 113, 123, 124, 21T038, 039, 041, 042, 043, 24C180, 181, 24T070, 071 ("S" Line) Tel. Rec.	313-4
General Electric	453	313-5
Masco	WFP	313-6
Monitoradio	MCA-100-H	313-7
Pilot	HF-56	313-8
RCA Victor	SRT-403 (MI-15917) Recorder	313-9
Raytheon	C2175B, M (Ch. 21T38) Tel. Rec.	313-10
Roland	5P5	313-11
Sentinel	IU-363	313-12
Setchell-Carlson	P-61 (Ch. C-100) Tel. Rec.	313-13
Westinghouse	H-934T21, H-934TU21, H-935T21, H-935TU21, H-938K21, H-938KU21, H-939K21, H-939KU21, H-941K21, H-941KU21, H-942K21, H-942KU21, H-950T24, H-950TU24, H-951T24, H-951TU24, H-954K24, H-954KU24, H-955K24, H-955KU24, H-956K24, H-956KU24 (Ch. V-2342-14, -24, -34, -44, V-2343-14, -24, -34, -44, V-2352-104, -204, -304, -404, V-2353-104, -204, -304, -404) Tel. Rec.	313-14

Emerson 1176 To 1184 Ch. 120292-P 313-155,
120293 P-V.
120299
120300

Philco. C5690 (HR) 313-155,

Zenith. Y2220R - (Y2222-37-47-50-58-81-) 313-155
Ch. 17Y20 - 17Y22 - 17Y-22

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 2 IN SET 297

General Electric Models 21C106, 21C107, 21C109, 21T32, 21T33, 21T36 and 21T37 ("N" Line) were covered in Photofact Folder 2 – Set 297.

Model 21T35 is electrically identical to the models covered.

Models 17T21 and 17T22 are electrically identical, except for the following changes:

POWER TRANSFORMER CHANGED

The power transformer (T1) is changed to part #RTP-329. A partial schematic showing the new transformer and the voltage output is given in Fig. 1.

HIGH VOLTAGE TRANSFORMER CHANGED

The horizontal output transformer (T2) is changed to part #RTO-173.

NEW PICTURE TUBE

Model 17T21 employs a 17RP4 picture tube.

Model 17T22 employs a 17HP4A picture tube.

The following production changes apply to all models.

In early versions of the 17" and 21" receivers, pins 6 and 10 of V15 were connected directly to boost (380V).

In later production of the 17" receiver a 47KΩ resistor is connected from pins 6 and 10 of V15 to boost (380V). A .2MFD capacitor is connected from pins 6 and 10 of V15 to ground.

Later versions of the 21" receivers employ a 100KΩ resistor connected from pins 6 and 10 of V15 to boost (380V). A .01MFD capacitor is connected from pins 6 and 10 of V15 to ground.

AGC CIRCUIT REVISED

Late versions of the 17" and 21" receivers employ delayed AGC feeding the tuner. A partial schematic is given in Fig. 2 showing the revised circuit. With this change R94 is omitted.

TUBE CHANGE

The horizontal multivibrator tube (V11) is changed to a 7AU7 in late versions. A partial schematic is given in Fig. 3 showing the new tube and associated circuitry.

TO IMPROVE VERTICAL STABILITY

C57 is decreased from 22MMF to 15MMF.

R55 is increased from 6.8KΩ to 10KΩ.

COMPONENT CHANGE

In some receivers a .0033MFD capacitor is added across C64.

The .0033MFD capacitor should be removed if the vertical output transformer (T3) is replaced by part #RTO-167.

GENERAL ELECTRIC MODELS 17T21, 17T22, 21C106, 21C107, 21C109, 21T32, 21T33, 21T35, 21T36, 21T37 ("N" Line)

PRODUCTION CHANGES
BULLETIN 151

PRODUCTION CHANGES
BULLETIN 151

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TO OBTAIN PROPER WIDTH

R87 (screen dropping resistor) may vary from 2.7KΩ, 1 watt to 4.7KΩ, 2 watts in 21" receivers. In 17" receivers R87 may vary from 220Ω, ½ watt to 1.2KΩ, 1 watt.

When replacing R87 choose value giving proper width.

ALTERNATE TUNERS

Tuner RJX-075 is electrically identical to tuner RJX-070.

Tuner RJX-076 is electrically identical to tuner RJX-070, except a 1MMF capacitor is added from the oscillator plate to ground.

Tuner RUX-011 is electrically identical to tuner RUX-010.

Tuner RUX-012 is electrically identical to tuner RUX-010, except for the following changes.

UHF oscillator tube is changed to a 6AF4.

The capacitor connected from pin 4 to pin 3 of the UHF oscillator is omitted.

The 180Ω resistor connecting to pin 3 of the UHF oscillator is also omitted.

COMPONENT CHANGE

R74 is omitted.

A .005MFD capacitor is added across R53.

R62 is increased from 22KΩ to 47KΩ.

R24 used in early production receivers only.

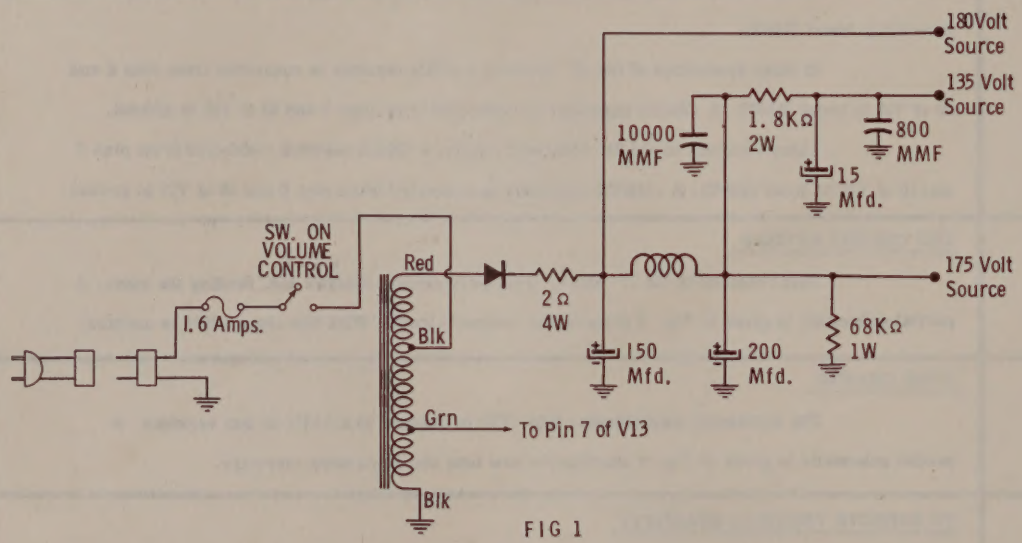


FIG 1

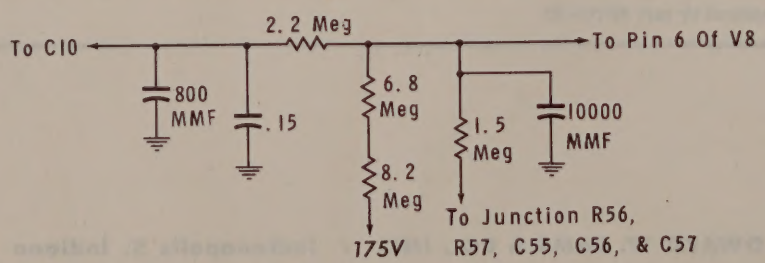


FIG. 2

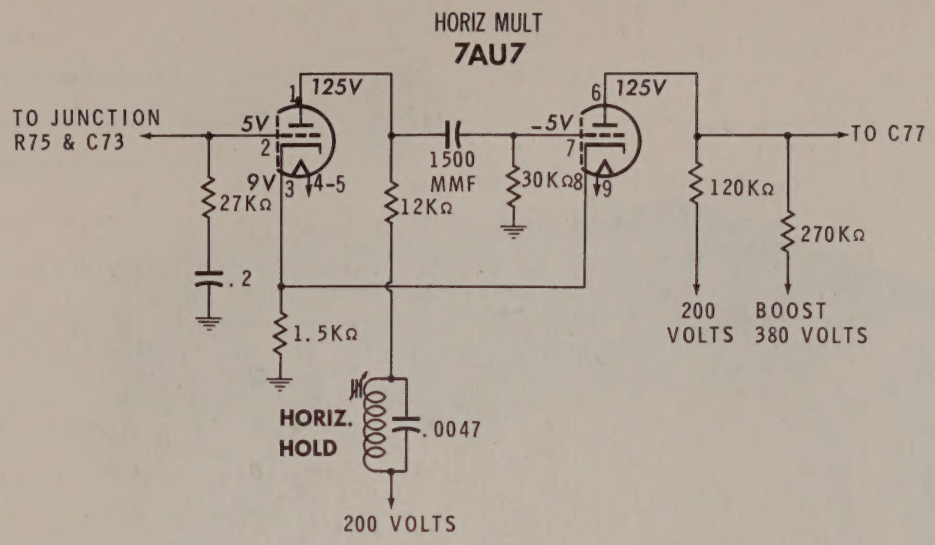
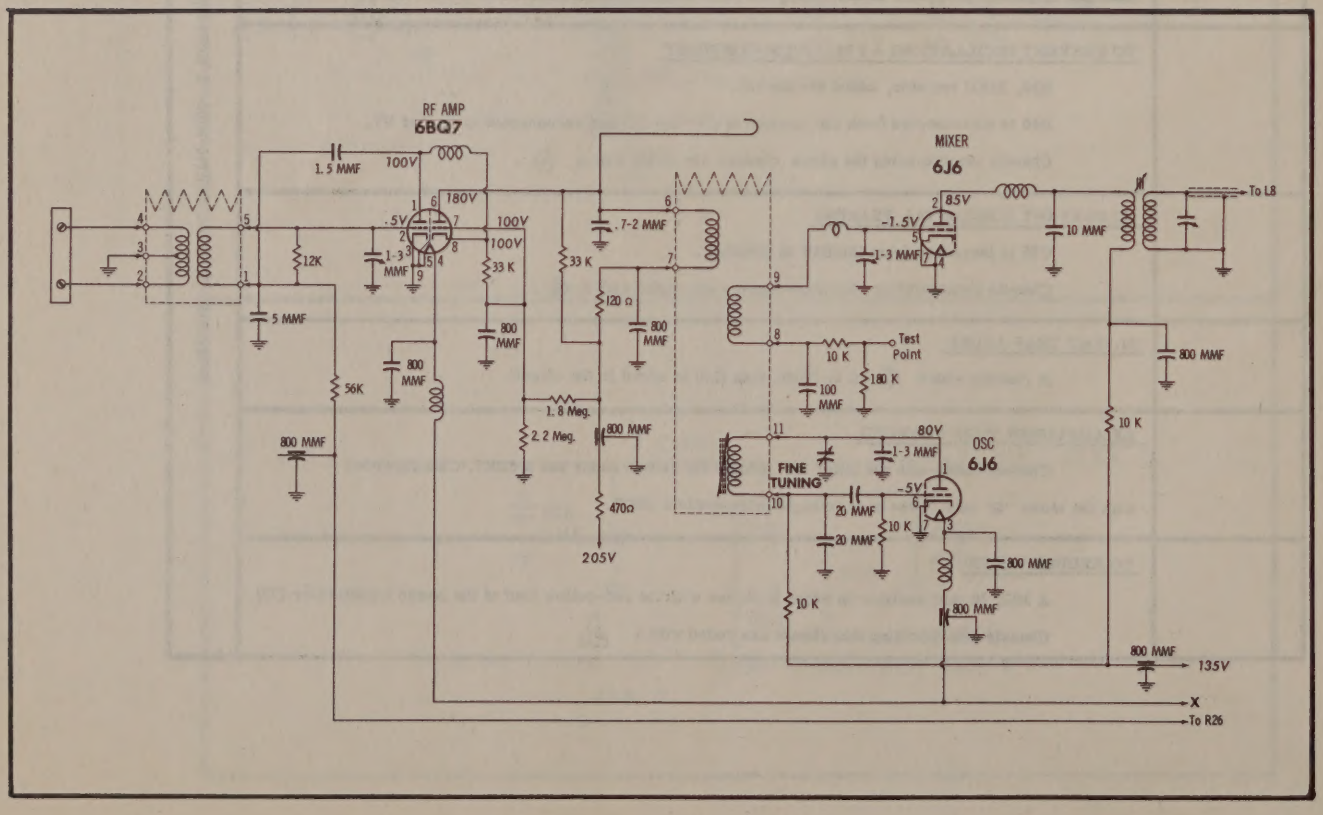


FIG 3

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 6 IN SET 169	
	Emerson models 700B and 701B (Ch. 120153-B) were covered in Photofact Folder 6 — Set 169. Model 700L (Ch. 120153-D), 714B (Ch. 120153-B), 714D and 715D (Ch. 120153-D) are added with the publication of this bulletin along with late production changes. Chassis 120153-D is electrically identical to chassis 120153-B except a 17LP4 picture tube is used.
	In later production the following changes were made. NEW VHF TUNER In late production tuner #470684 is incorporated. A schematic of this tuner is given in this bulletin. Alignment procedure is essentially the same as given for tuner #470681 in PFF 169-6.
	TO PREVENT OSCILLATIONS AT MAXIMUM CONTRAST R39, 33KΩ resistor, added across L13. R40 is disconnected from the junction of C34 and L13 and reconnected to pin 1 of V7. Chassis incorporating the above changes are coded with a Ⓐ.
	TO PREVENT HORIZONTAL TEARING C55 is increased from 110MMF to 220MMF. Chassis incorporating the above change are coded with a Ⓑ.
	21.25MC TRAP ADDED In chassis coded Ⓒ a 21.25MC trap (L9) is added in the circuit.
	RF AMPLIFIER TUBE CHANGED Chassis coded with the letter "K" outside the code triangle use a 6BK7. Chassis coded with the letter "Q" outside the code triangle incorporate a 6BQ7.
	TO REDUCE WIDTH A 30Ω, 10 watt resistor is added in series with the red-yellow lead of the power transformer (T1). Chassis incorporating this change are coded with a Ⓕ1.


RF AMP
6BQ7
MIXER
6J6
OSC
6J6
1.5 MMF
100V
180V
.5V
100V
100V
.7-2 MMF
1-3 MMF
33 K
33 K
120 Ω
800 MMF
800 MMF
12K
5 MMF
56K
800 MMF
800 MMF
1.8 Meg.
2.2 Meg.
800 MMF
470Ω
205V
8.5V
-1.5V
1-3 MMF
10 MMF
To L8
Test Point
10 K
180 K
100 MMF
800 MMF
10 K
80V
1-3 MMF
FINE TUNING
-5V
20 MMF
20 MMF
10 K
800 MMF
10 K
800 MMF
800 MMF
135V
X
To R26

PHOTOFACT* Folder

RETMA MEMBER

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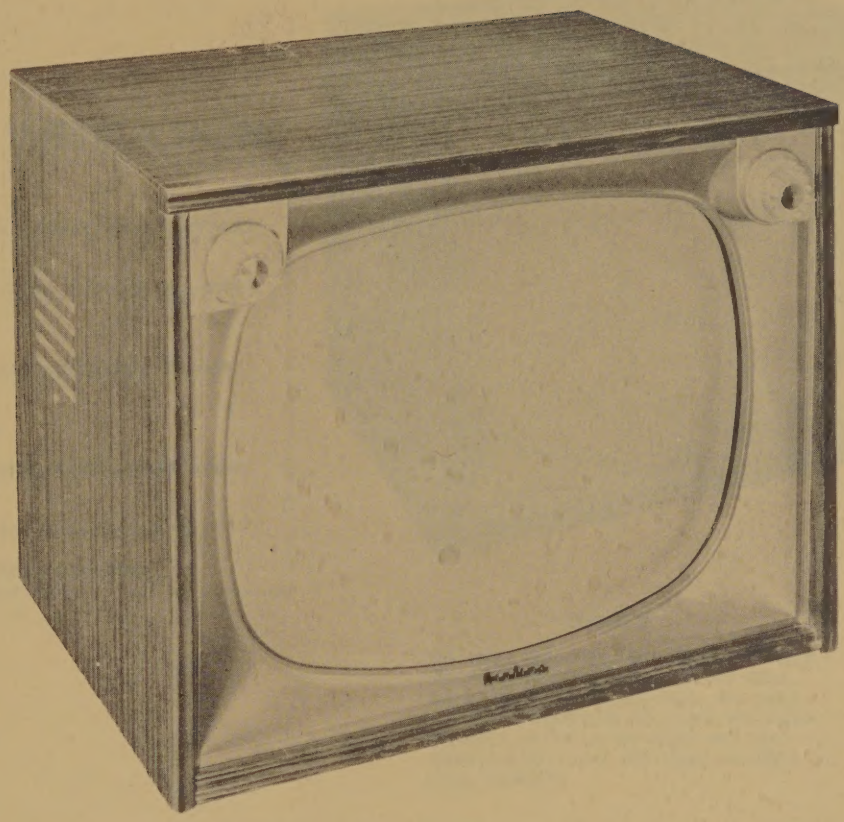
The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

AIRLINE MODELS WG-4011A, B, WG-4012A, B, WG-4111A, B, C, WG-4112A, B, C, WG-5011A, B, WG-5014A, B, WG-5016A, WG-5018A, WG-5111A, B, C, WG-5114A, B, C, WG-5116A, WG-5118A (Ch. 21A59CT)



AIRLINE MODEL WG-4011B

TRADE NAME	Airline	MODELS WG-4011A, WG-4011B, WG-4012A, WG-4012B, WG-4111A, WG-4111B, WG-4111C, WG-4112A, WG-4112B, WG-4112C, WG-5011A, WG-5011B, WG-5014A, WG-5014B, WG-5016A, WG-5018A, WG-5111A, WG-5111B, WG-5111C, WG-5114A, WG-5114B, WG-5114C, WG-5116A, WG-5118A .....Code 21A59CT
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Illinois	
TYPE SET	Television Receiver	
TUBES	Sixteen	
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.38 Amp. @ 117 Volts AC
TUNING RANGE	Channel 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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PHOTOFACT* Folder
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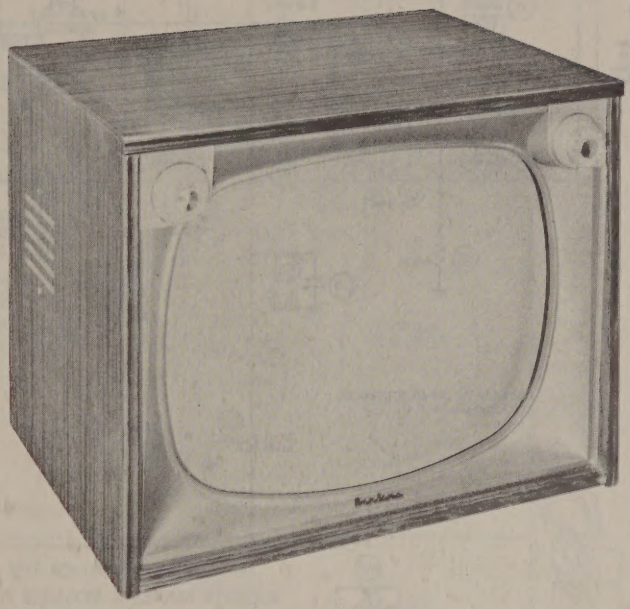
AIRLINE MODELS WG-4011A, B, WG-4012A, B, WG-4111A, B, C, WG-4112A, B, C, WG-5011A, B, WG-5014A, B, WG-5016A, WG-5018A, WG-5111A, B, C, WG-5114A, B, C, WG-5116A, WG-5118A (Ch. 21A59CT)



DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.
2. Remove 2 metal screws holding upper left trim plate.
3. Remove 3 small knobs.
4. Remove 5 wood screws and 1 metal screw. Remove rear cover.
5. Disconnect speaker leads.
6. Remove 2 wood screws holding rear cabinet braces at the top.
7. Remove 6 cabinet bolts. Lift cabinet up and off.
8. Remove 2 speaker nuts. Remove speaker.

MODELS

WG-4011A, WG-4011B, WG-4012A, WG-4012B, WG-4111A, WG-4111B, WG-4111C, WG-4112A, WG-4112B, WG-4112C, WG-5011A, WG-5011B, WG-5014A, WG-5014B, WG-5016A, WG-5018A, WG-5111A, WG-5111B, WG-5111C, WG-5114A, WG-5114B, WG-5114C, WG-5116A, WG-5118A (Code 21A59CT)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs and 2 metal screws holding trim plate, adjustments are accessible, one at a time, thru the small hole in the cabinet to the right and below the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 7 push-on type control knobs from front panel of cabinet. Remove 4 metal screws holding 2 trim plates. Remove trim plates. Tilt safety glass forward and lift out. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Adjustment is located on the tube side of the chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (L23) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the chassis. Adjust the buzz control (R7) for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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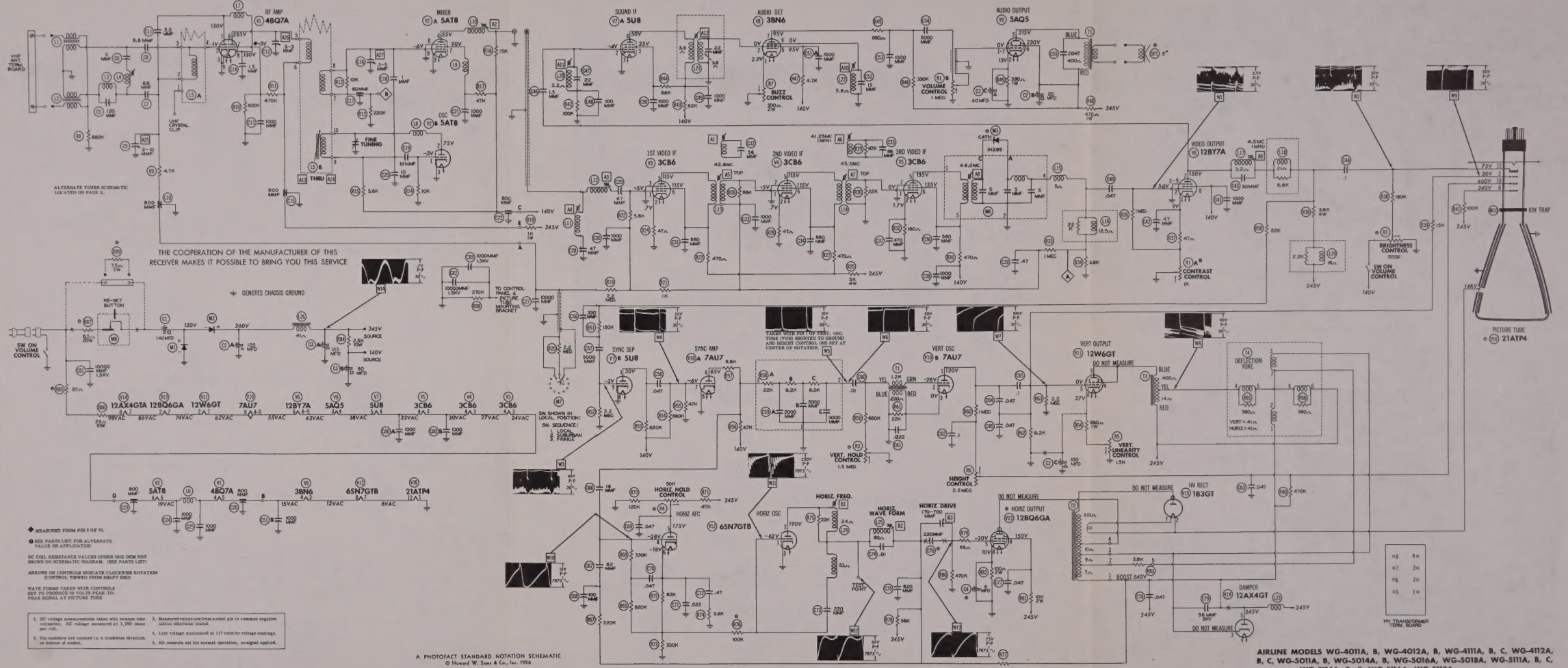
RF AMP V1 4BQ7A
MIXER V2A 5AT8
OSC V2B 5AT8
SOUND IF V7A 5U8
AUDIO DET V8 3BN6
AUDIO OUTPUT V9 5AQ5
1ST VIDEO IF V3 3CB6
2ND VIDEO IF V4 3CB6
3RD VIDEO IF V5 3CB6
VIDEO OUTPUT V6 12BY7A
SYNC SEP V7B 5U8
SYNC AMP V10A 7AU7
VERT OSC V10B 7AU7
VERT OUTPUT V11 12W6GT
HORIZ OSC V12A 6SN7GTB
HORIZ AFC V12B 6SN7GTB
HORIZ OUTPUT V13 12BQ6GA
HV RECT V15 1B3GT
DAMPER V14 12AX4GT
PICTURE TUBE V16 21ATP4
IN295
ION TRAP
VHF ANT. TERM. BOARD
UHF CRYSTAL CLIP
FINE TUNING
ALTERNATE TUNER SCHEMATIC LOCATED ON PAGE 12.
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
DENOTES CHASSIS GROUND
SW ON VOLUME CONTROL
RE-SET BUTTON
TO CONTROL PANEL & PICTURE TUBE MOUNTING BRACKET
SW SHOWN IN LOCAL POSITION:
SW. SEQUENCE: 1. LOCAL 2. SUBURBAN 3. FRINGE
TAKEN WITH PIN 7 OF TEST OSC. TUBE (V10B) SHORTED TO GROUND AND HEIGHT CONTROL (R6) SET AT CENTER OF ROTATION.
VOLUME CONTROL 1 MEG
BUZZ CONTROL 500 2W
CONTRAST CONTROL 1K
BRIGHTNESS CONTROL 500K
SW ON VOLUME CONTROL
VERT. HOLD CONTROL 1.5 MEG
VERT. LINEARITY CONTROL 1.5K
HEIGHT CONTROL 2.5 MEG
HORIZ. HOLD CONTROL 50K
HORIZ. FREQ.
HORIZ. WAVE FORM
HORIZ. DRIVE 170-700 MMF
DEFLECTION YOKE
VERT = 41Ω
HORIZ = 41Ω
BOOST 540V
DO NOT MEASURE
TEST POINT
HV TRANSFORMER TERM. BOARD
12AX4GTA 12BQ6GA 12W6GT 7AU7 12BY7A 5AQ5 5U8 3CB6 3CB6 3CB6
5AT8 4BQ7A 3BN6 6SN7GTB 21ATP4

◆ MEASURED FROM PIN 8 OF V1.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1,000 ohms per volt.
2. Measured values are from socket pin to common negative unless otherwise stated.
3. Pin numbers are counted in a clockwise direction on bottom of socket.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

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AIRLINE MODELS WG-4011A, B, WG-4012A, B, WG-4111A, B, C, WG-4112A, B, C, WG-5011A, B, WG-5014A, B, WG-5016A, WG-5018A, WG-5111A, B, C, WG-5114A, B, C, WG-5116A, WG-5118A

AIRLINE MODELS WG-4011A, B, WG-4012A, B, WG-4111A, B, C, WG-4112A, B, C, WG-5011A, B, WG-5014A, B, WG-5016A, WG-5018A, WG-5111A, B, C, WG-5114A, B, C, WG-5116A, WG-5118A (CH. 21A5YC)

TUBE PLACEMENT CHART

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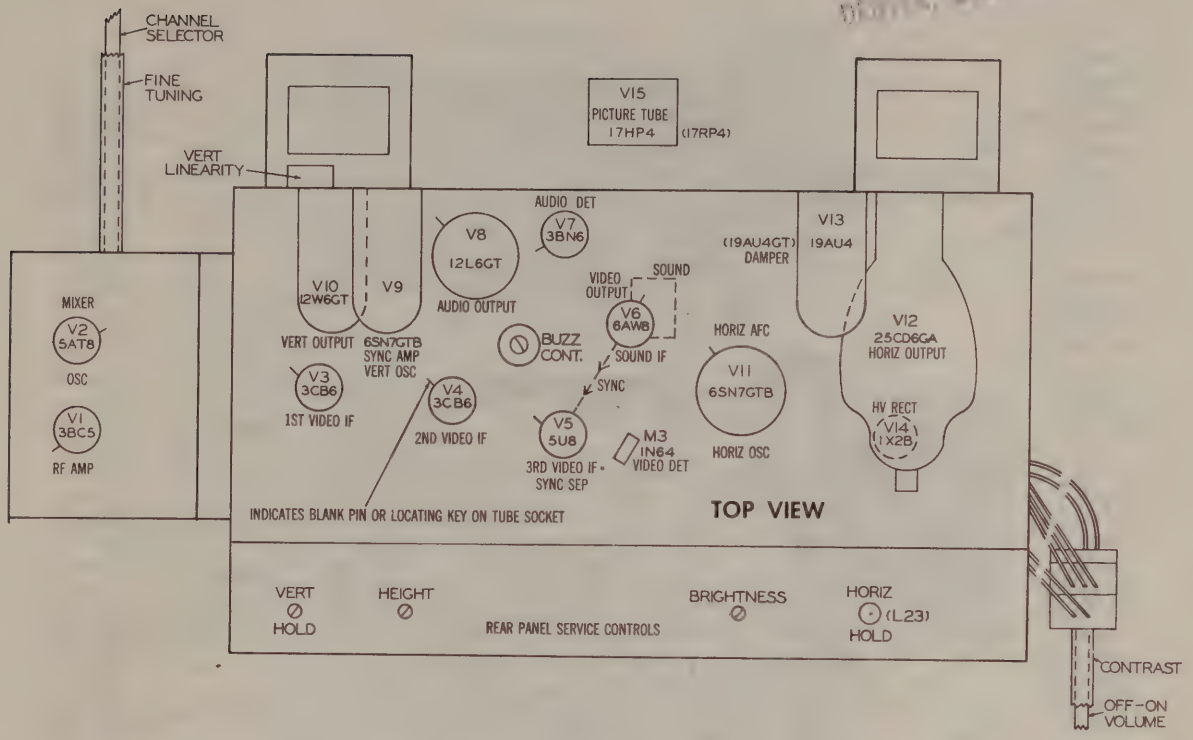


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

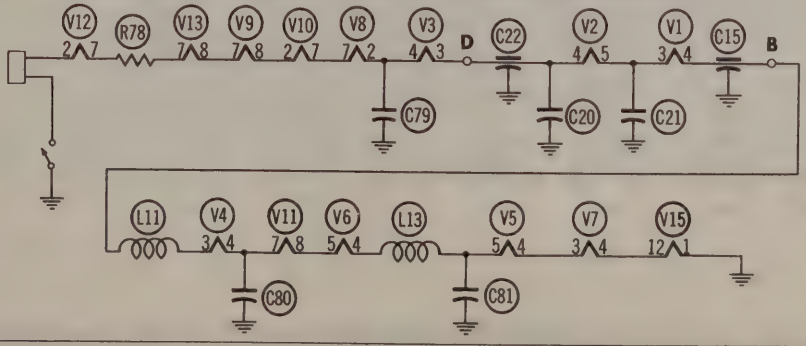
POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifier (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V15
Has pic, no sound - V6, V7, V8

SYNC FAILURE
No vert. sync - V9
No horiz. sync - V9, V11
No vert. or horiz. sync - V5, V9

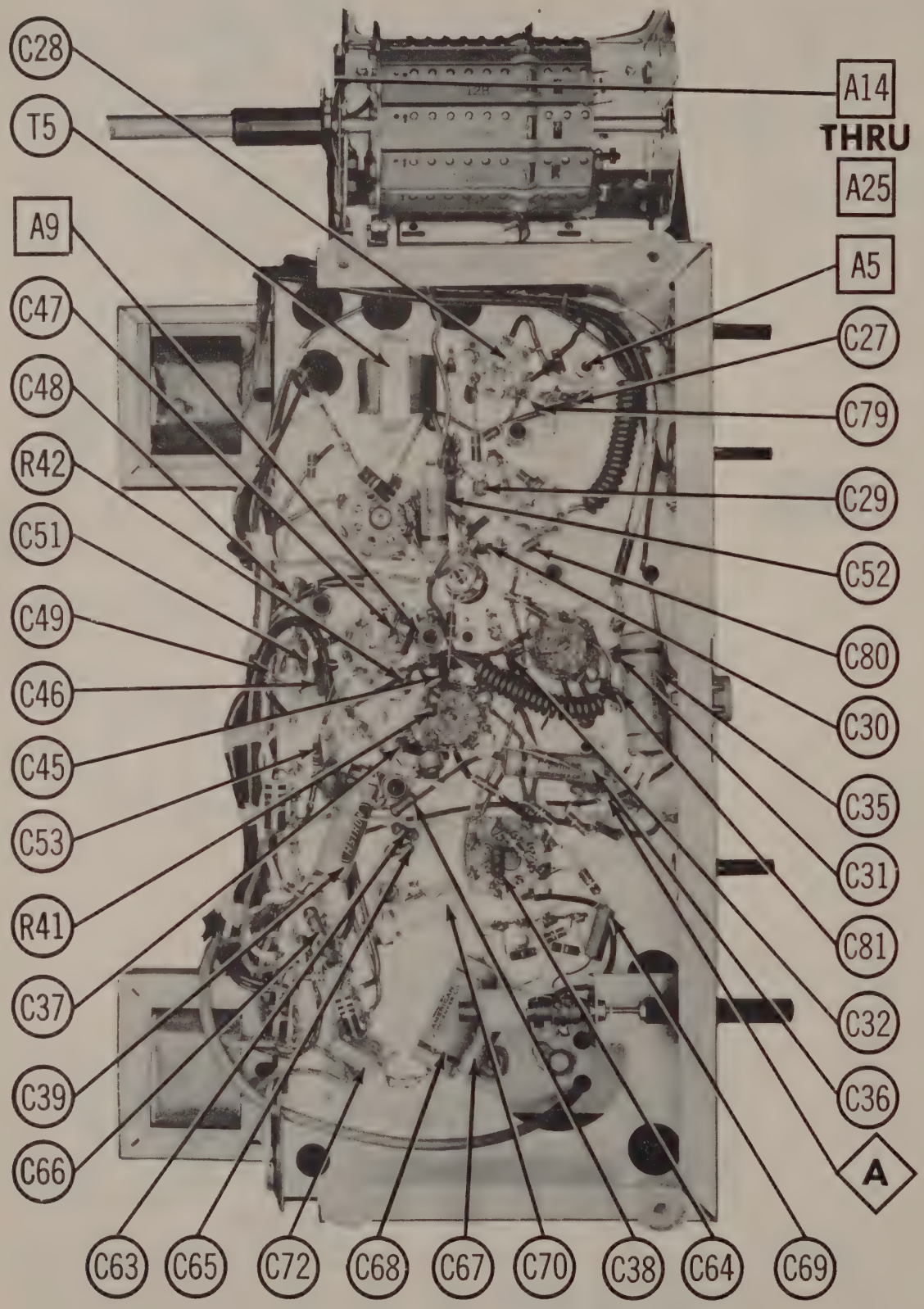
SWEEP FAILURE
No raster, has sound - V11, V12, V13, V14, V15
No vertical deflection - V9, V10
Poor vert. linearity or foldover - V9, V10
Poor horiz. linearity or foldover - V11, V12, V13
Narrow picture - V11, V12, V13, V14, M1
Vert. off freq. - V9
Horiz. off freq. - V9, V11

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative (See circuit below).



SET 308 FOLDER 2

AIRLINE MODELS GSL-4013A, -4014A, -4015A, -4018A, GSL-4113A, -4114A, -4115A, -4118A



LOWER DECK CHASSIS BOTTOM VIEW CAPACITOR & ALIGN. IDENT.

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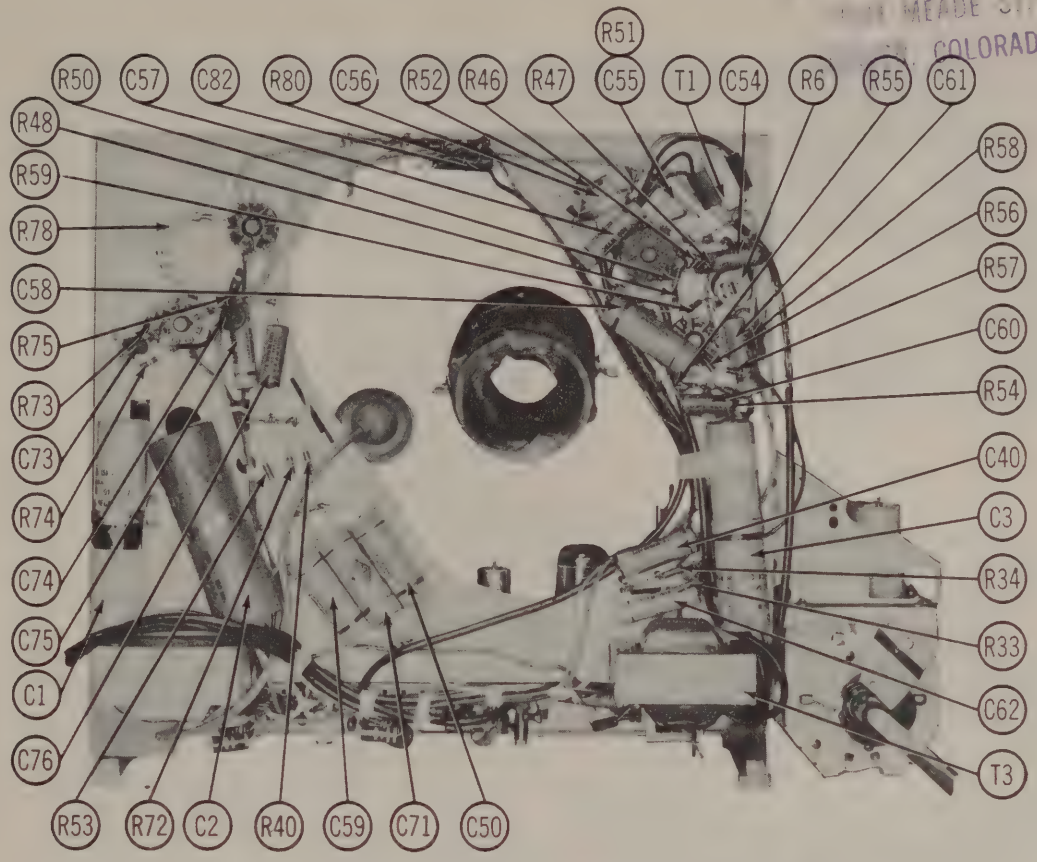
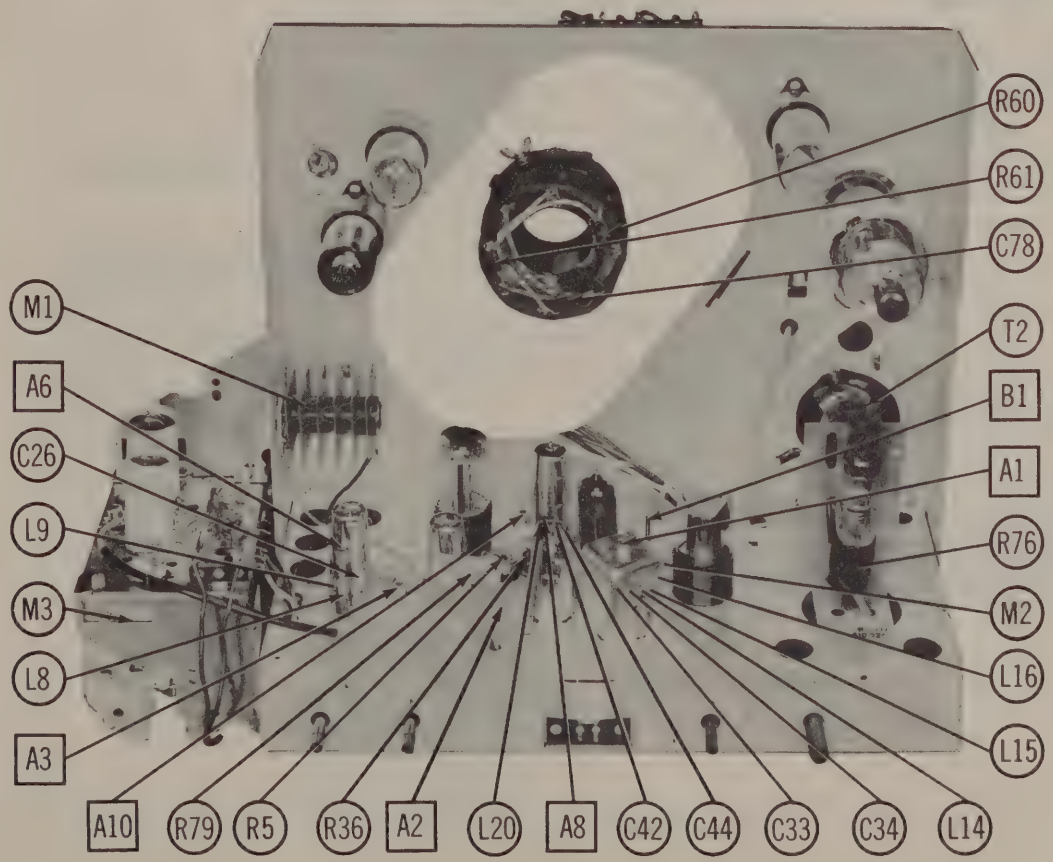


UPPER DECK CHASSIS BOTTOM VIEW



CHASSIS REAR VIEW

SET 308 FOLDER 2

ALIGNMENT

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment. The high voltage lead should be securely taped and kept away from chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C35. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over osc.-mixer tube (V2). Low side to chassis.	43.8MC (Unmod)	Between any two channels	DC probe to point (A). Common to chassis.	A1	Attenuate signal generator for not more than 1 volt on VTVM at maximum deflection. Adjust for maximum deflection.
2.	"	"	43.3MC	"	"	A2	"
3.	"	"	45.2MC	"	"	A3	"
4.	"	"	43.8MC	"	"	A4	Detune A5 by tuning core counter clockwise. Adjust A4 for maximum deflection.
5.	"	"	45.4MC	"	"	A5	Attenuate signal generator for not more than 1 volt on VTVM at maximum deflection. Adjust for maximum deflection.
6.	"	"	41.25MC	"	"	A6	Increase signal generator output and adjust A6 for MINIMUM deflection on VTVM.

OVERALL VIDEO IF RESPONSE CHECK

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C35. Connect the positive lead to chassis. If sweep generator has no built-in marker, loosely couple a separate marker generator to sweep generator output. Use only enough sweep generator output for useable pattern on scope. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Direct	High side to an ungrounded tube shield floating over osc.-mixer tube (V2). Low side to chassis.	44MC (10MC Swp)	41.25MC 42.9MC 45.75MC	Between any two channels	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig.1. If necessary, retouch A1 thru A5 for desired response. A2 affects low frequency side of response and position of 42.9MC. A3 affects high frequency side of response and position of 45.75MC marker. A1 affects tilt. A4 and A5 affect bandwidth and should not require readjusting. Increase sweep generator output to observe 41.25MC trap. If necessary, retouch A6 to place 41.25MC marker in trap notch as in Fig. 1.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.01MFD	High side to pin 7 (grid) of video amplifier (V6A). Low side to chassis.	Not used	4.5MC (400∿Mod)	Any non-interfering channel	Vert. Amp. thru detector (Fig.2) to pin 11 (cathode) of picture tube. Low side to chassis.	A7	Adjust for MINIMUM 400∿ indication on scope.

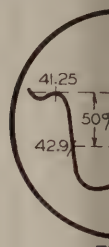
SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Set volume control for normal volume.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.01MFD	High side to pin 7 (grid) of video amplifier (V6A). Low side to chassis.	4.5MC (400∿Mod) (50KC Swp)	4.5MC	Any non-interfering channel	Across secondary of audio output transformer (T5).	A10	Set buzz control (R5) at the center of its rotation. Adjust for maximum 400∿ indication on scope.
10.	"	"	"	"	"	"	A8, A9	Attenuate generator output so that signal level is below the limiting level of the 3BN6 as evidenced by background hiss and noise. Adjust A8 and A9 for maximum response on scope.
11.	"	"	Not used	4.5MC (400∿Mod)	"	"	R5	Use high signal generator output and adjust R5 for MINIMUM 400∿ indication.
12.	"	"	4.5MC (400∿Mod) (50KC Swp)	4.5MC	"	"	A10	With volume control at low level retouch A10 for maximum 400∿ indication on scope. Remove test equipment. Connect antenna and tune in weakest TV station in area and retouch R5 for MINIMUM buzz and hiss. Tune in strongest TV station in area and retouch A10 for clearest sound.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Remove the bias battery. Turn the buzz control at the center of its rotation. Turn set on and tune in a strong TV signal. Adjust A10 for maximum volume. Reduce the signal strength into the receiver by inserting an attenuator in series with the antenna and receiver antenna terminals. If a suitable attenuator is not available, remove the antenna from the antenna terminals and stray feed the signal into the receiver by placing the antenna near the antenna terminals. Adjust A8 and A9 for maximum volume. Adjust R5 for minimum noise. Reconnect antenna and readjust A10 for maximum volume. If necessary, reduce volume so that this peak can be heard.



F

FIG. 2

FIG. 3

F

PROPERTY OF
L. F. BLANKE
3924 MEADE ST.
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment. The high voltage lead should be securely taped and kept away from chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C35. Connect the positive lead to chassis

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over osc.-mixer tube (V2). Low side to chassis.	43.8MC (Unmod)	Between any two channels	DC probe to point (A). Common to chassis.	A1	Attenuate signal generator for not more than 1 volt on VTVM at maximum deflection. Adjust for maximum deflection.
2.	"	"	43.3MC	"	"	A2	"
3.	"	"	45.2MC	"	"	A3	"
4.	"	"	43.8MC	"	"	A4	Detune A5 by tuning core counter clockwise. Adjust A4 for maximum deflection.
5.	"	"	45.4MC	"	"	A5	Attenuate signal generator for not more than 1 volt on VTVM at maximum deflection. Adjust for maximum deflection.
6.	"	"	41.25MC	"	"	A6	Increase signal generator output and adjust A6 for MINIMUM deflection on VTVM.

OVERALL VIDEO IF RESPONSE CHECK

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C35. Connect the positive lead to chassis. If sweep generator has no built-in marker, loosely couple a separate marker generator to sweep generator output. Use only enough sweep generator output for useable pattern on scope. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Direct	High side to an ungrounded tube shield floating over osc.-mixer tube (V2). Low side to chassis.	44MC (10MC Swp)	41.25MC 42.5MC 45.75MC	Between any two channels	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig.1. If necessary, retouch A1 thru A5 for desired response. A2 affects low frequency side of response and position of 45.75MC. A3 affects high frequency side of response and position of 45.75MC marker. A1 affects tilt. A4 and A5 affect bandwidth and should not require readjusting. Increase sweep generator output to observe 41.25MC trap. If necessary, retouch A6 to place 41.25MC marker in trap notch as in Fig. 1.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.01MFD	High side to pin 7 (grid) of video amplifier (V6A). Low side to chassis.	Not used	4.5MC (400∿Mod)	Any non-interfering channel	Vert. Amp. thru detector (Fig.2) to pin 11 (cathode) of picture tube. Low side to chassis.	A7	Adjust for MINIMUM 400∿ indication on scope.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Set volume control for normal volume.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	.01MFD	High side to pin 7 (grid) of video amplifier (V6A). Low side to chassis.	4.5MC (400∿Mod) (50KC Swp)	4.5MC	Any non-interfering channel	Across secondary of audio output transformer (T5).	A10	Set buzz control (R5) at the center of its rotation. Adjust for maximum 400∿ indication on scope.
10.	"	"	"	"	"	"	A8, A9	Attenuate generator output so that signal level is below the limiting level of the 3BN6 as evidenced by background hiss and noise. Adjust A8 and A9 for maximum response on scope.
11.	"	"	Not used	4.5MC (400∿Mod)	"	"	R5	Use high signal generator output and adjust R5 for MINIMUM buzz and hiss.
12.	"	"	4.5MC (400∿Mod) (50KC Swp)	4.5MC	"	"	A10	With volume control at low level retouch A10 for maximum 400∿ indication on scope. Remove test equipment. Connect antenna and tune in weakest TV station in area and retouch R5 for MINIMUM buzz and hiss. Tune in strongest TV station in area and retouch A10 for clearest sound.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Remove the bias battery. Turn the buzz control at the center of its rotation. Turn set on and tune in a strong TV signal. Adjust A10 for maximum volume. Reduce the signal strength into the receiver by inserting an attenuator in series with the antenna and receiver antenna terminals. If a suitable attenuator is not available, remove the antenna from the antenna terminals and stray feed the signal into the receiver by placing the antenna near the antenna terminals. Adjust A8 and A9 for maximum volume. Adjust R5 for minimum noise. Reconnect antenna and readjust A10 for maximum volume. If necessary, reduce volume so that this peak can be heard.

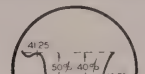


FIG. 1

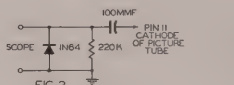


FIG 2

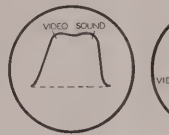


FIG. 3

FIG. 4

FIG. 5

RF AND MIXER ALIGNMENT FOR TUNER R-1453

Connect the negative lead of a 3 volt bias supply to terminal "A" (AGC line) on tuner. Connect the positive lead to chassis. If sweep generator has no built in marker, loosely couple a separate marker generator to sweep generator output. Use only enough sweep generator output for useable pattern on scope. Connect a .001MFD capacitor from pin 1 (grid) of first video IF amplifier tube (V3) to chassis. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (90MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A11, A12, A13	Adjust for response curve similar to Fig.3.
14.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response curve similar to Fig. 3 on each channel. If markers fall below 70% on any channel make compromise adjustment of A11, A12 and A13 with channel switch set to that channel. Recheck all other channels to see that they haven't been seriously affected. Remove .001MFD capacitor from pin 1 of V3 and chassis.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

OSCILLATOR ALIGNMENT FOR TUNER R-1423

The channel oscillator adjustment screws are reached thru a hole just above the fine tuning shaft. The correct oscillator adjustment screw is accessible through this hole as the channel switch is turned to each channel. Connect bias as under "RF And Mixer Alignment" for Tuner R1423. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 4. Use high scope gain and increase sweep generator output to view trap region. Video marker should fall at 50% on response curve.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A15	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A16	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A17	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A18	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A19	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A20	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A21	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A22	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A23	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A24	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A25	

VHF RF AND MIXER ALIGNMENT FOR TUNER R-1523

Connect the negative lead of a 3 volt bias supply to terminal 9 (AGC line) of tuner. Connect the positive lead to chassis. Connect a .001MFD capacitor from pin 1 (grid) of first video IF amplifier tube (V3) to chassis. Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (90MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A26, A27, A28	Adjust A26 and A27 for response curve similar to Fig. 3. If unable to obtain correct response by adjusting A26 and A27, remove tuner shield and adjust A28 if necessary, retouch A27 and A28 until desired response is obtained.
17.	"	"	207MC (90MC Swp)	205.25MC 209.75MC	12	"		Check for response curve similar to Fig.3 on each channel. If marker falls below 70% on any one channel, make compromise adjustments of A26, A27 and A28 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected. Remove .001MFD capacitor from pin 1 of V3 and chassis.
			201MC (90MC Swp)	199.25MC 203.75MC	11			
			195MC (90MC Swp)	193.25MC 197.75MC	10			
			189MC (90MC Swp)	187.25MC 191.75MC	9			
			183MC (90MC Swp)	181.25MC 185.75MC	8			
			177MC (90MC Swp)	175.25MC 179.75MC	7			
			85MC (90MC Swp)	83.25MC 87.75MC	6			
			79MC (90MC Swp)	77.25MC 81.75MC	5			
			69MC (90MC Swp)	67.25MC 71.75MC	4			
			63MC (90MC Swp)	61.25MC 65.75MC	3			
			57MC (90MC Swp)	55.25MC 59.75MC	2			

AIRLINE MODELS GSL-4013A, -4014A, -4015A, -4018A, GSL-4113A, -4114A, -4115A, -4118A

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT FOR TUNER R-1623

Connect bias as under "VHF RF and Mixer Alignment for Tuner R-1623". Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
18.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A29	Adjust to place sound marker in trap notch as in Fig. 4. Use high scope gain and increase sweep generator output to view trap region. Video marker should fall at 50% on response curve.
19.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"		Check all high band channels for response curve similar to Fig. 4 with sound marker in trap notch and video marker approximately at 50% on response curve. If necessary, slightly retouch A29 to make compromise adjustment for all high band channels.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
20.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A30	Adjust to place sound marker in trap notch as in Fig. 4. Use high scope gain and increase sweep generator output to view trap region. Video marker should fall at 50% on response curve.
21.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5	"	A31	Check for response curve similar to Fig. 4. If necessary adjust by compressing or expanding coil to place sound marker in trap notch and video marker at 50% on response curve.
			69MC (10MC Swp)	67.25MC 71.75MC	4		A32	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A33	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A34	

UHF ALIGNMENT FOR TUNER R-1623

If sweep generator has no built in marker, loosely couple a separate marker generator to sweep output. Connect the negative lead of a 1.5 volt bias supply to tuner AGC line. Connect the positive lead to chassis. Connect a clip lead from pin 2 (grid) of 5U8 (Osc-Mixer) tube to chassis. Set channel selector to UHF position.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
22.	Two 120Ω Carbon Resistors	Across UHF antenna terminals with 120Ω in each lead.	Sweep all UHF channels separately	41.25MC 45.75MC	All UHF channels separately	Vert. Amp. thru 10KΩ to point Ⓒ. Low side to chassis.	A35,A36, A37,A38	Adjust A35 thru A38 for maximum gain and response similar to Fig. 5. If unable to obtain the correct bandpass by adjusting A35 thru A38, adjust A39 thru A42, then readjust A35 thru A38 for desired response. A39 thru A42 are adjusted by compressing or expanding coil turns.
23.	"	"	473MC (10MC Swp)	471.25MC 475.75MC	14	Vert. Amp. thru 10KΩ to point Ⓒ. Low side to chassis.	A43	Connect the negative lead of a 3 volt bias supply to the ungrounded side of C35. Connect positive lead to chassis. Adjust to place sound marker in trap notch as in Fig. 4. Use high scope gain and increase sweep generator output to view trap region. Video marker should fall at 50% on response curve.
24.	"	"	887MC (10MC Swp)	885.25MC 889.75MC	83	"	A44	"

PROPER
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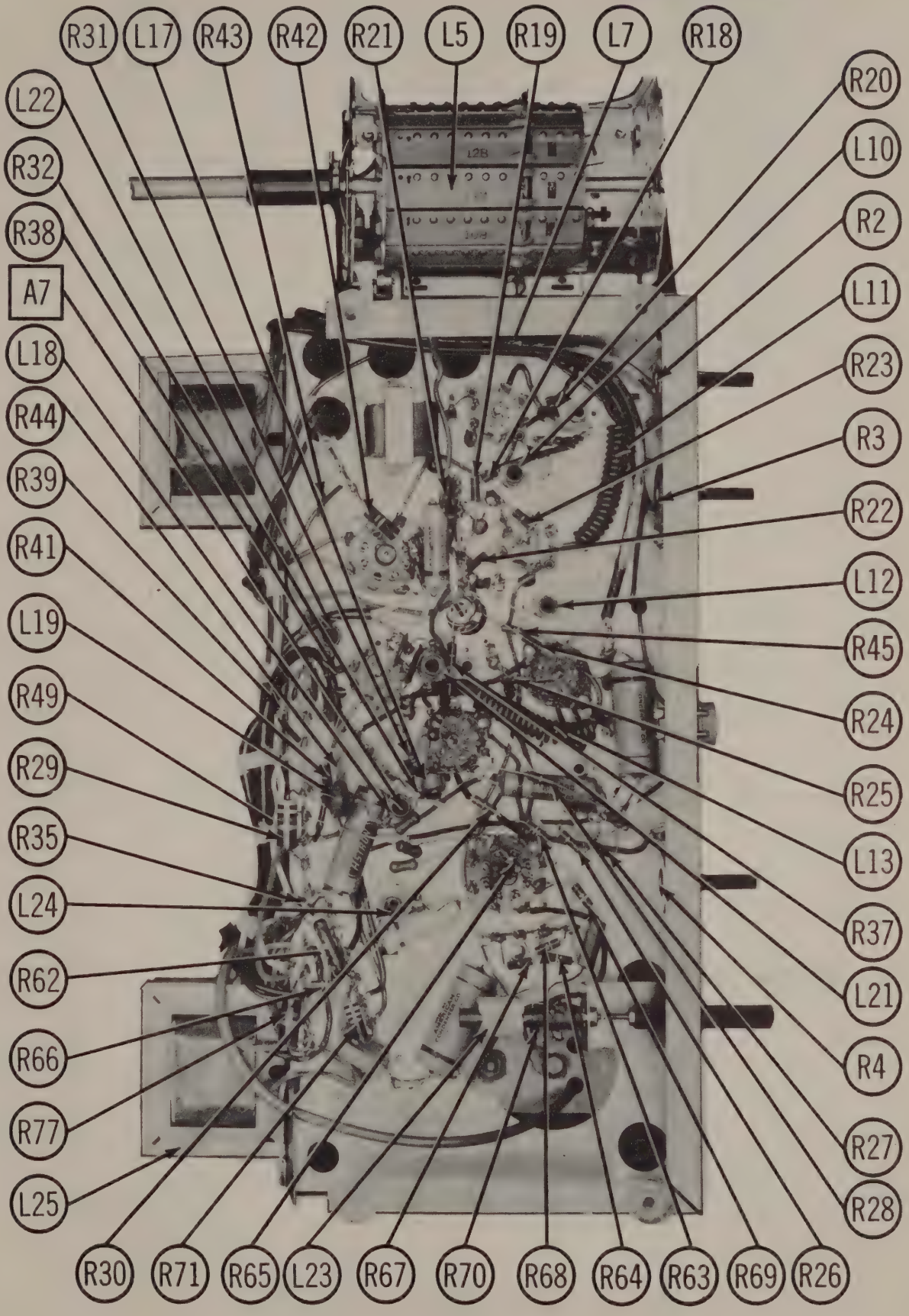
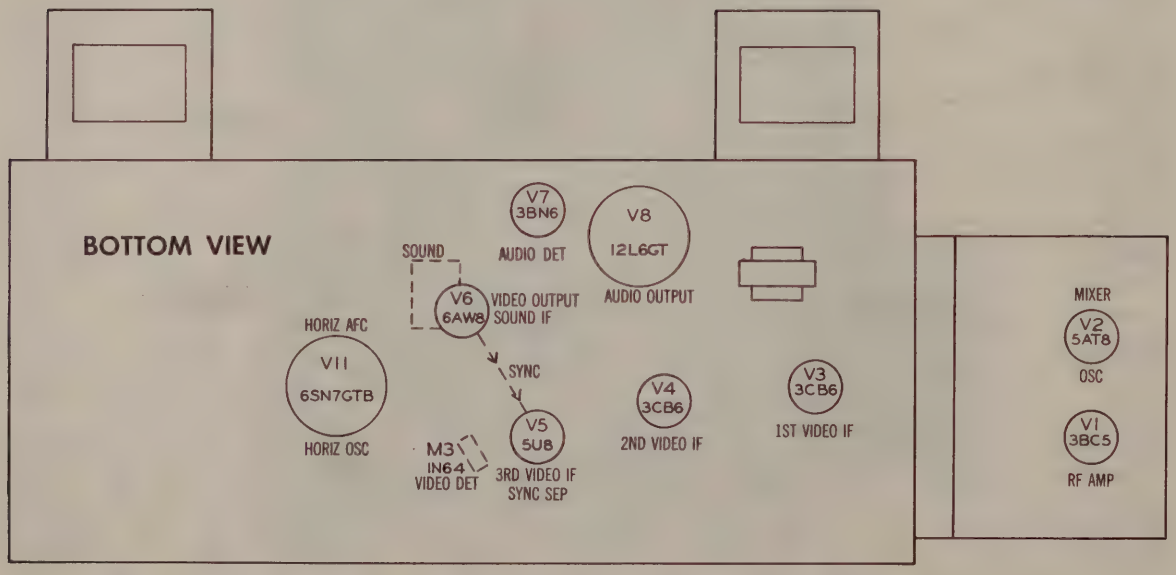


LOWER DECK CHASSIS BOTTOM VIEW RESISTOR & INDUCTOR IDENT.

RESISTANCE MEASUREMENTS

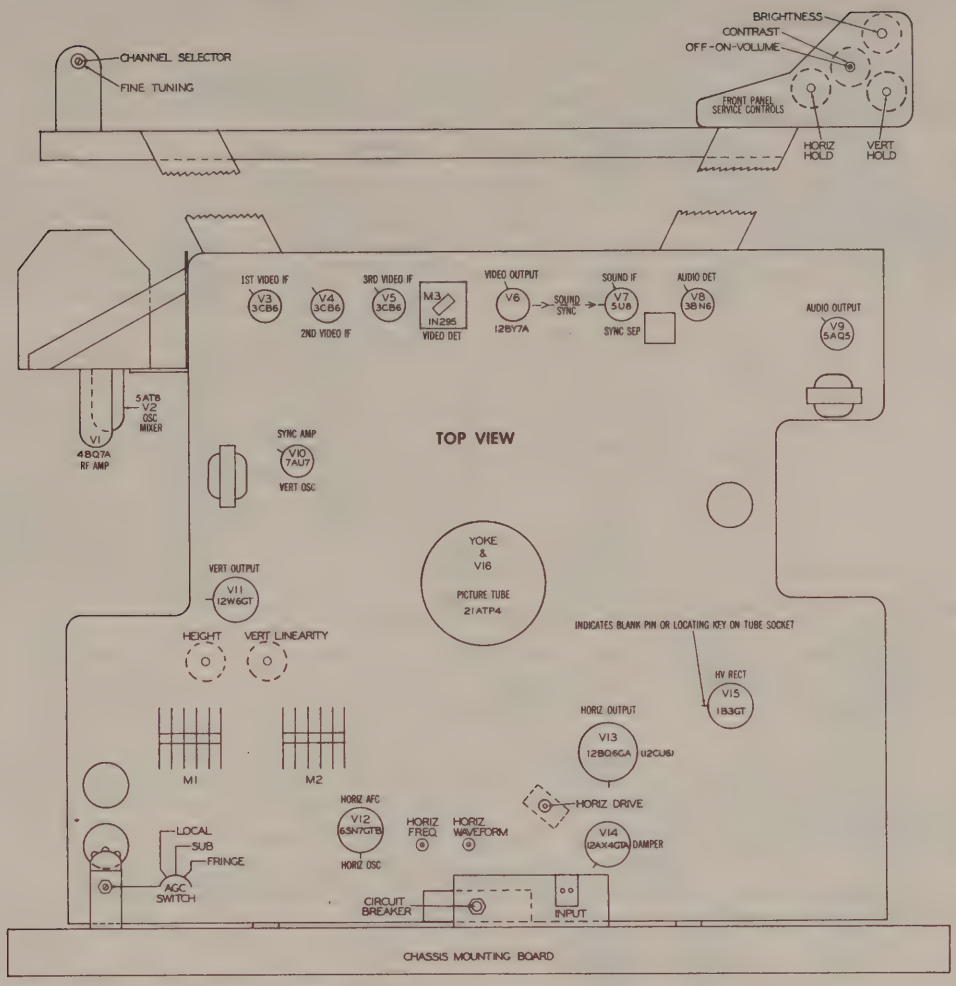
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	3BC5	1Meg	0Ω	10Ω	9Ω	†100Ω	† 2. 3KΩ	0Ω		
V 2	5AT8	10KΩ	†4KΩ	0Ω	11Ω	10Ω	† 1. 1KΩ	† 47KΩ	0Ω	220KΩ
V 3	3CB6	1Meg	47Ω	11Ω	12Ω	† 250Ω	† 250Ω	0Ω		
V 4	3CB6	1Meg	47Ω	9Ω	8Ω	† 250Ω	† 250Ω	0Ω		
V 5	5U8	† 680KΩ	. 1Ω	† 600Ω	3Ω	4Ω	† 600Ω	180Ω	0Ω	2. 2Meg
V 6	6AW8	0Ω	56KΩ	† 4. 8KΩ	4Ω	6Ω	180Ω	650KΩ	† 2. 8KΩ	† 3. 4KΩ
V 7	3BN6	300Ω	3. 5Ω	3Ω	2Ω	† 4. 8KΩ	5. 5Ω	▲ 400KΩ		
V 8	12L6GT	NC	12Ω	† 445Ω	† 235Ω	150KΩ	NC	15Ω	150Ω	
V 9	6SN7GTB	22KΩ	† 9. 5KΩ	0Ω	550KΩ	▲ 3Meg	0Ω	19Ω	18Ω	
V 10	12W6GT	NC	18Ω	†475Ω	†65Ω	2. 2Meg	NC	15Ω	500Ω	
V 11	6SN7GTB	800KΩ	† 100Ω	300KΩ	250KΩ	† 50KΩ	0Ω	8Ω	6Ω	
V 12	25CD6GA	NC	39Ω	0Ω	TP	150KΩ	NC	33Ω	† 1KΩ	TOP CAP ▲ 6. 5Ω
V 13	19AU4	NC	NC	130KΩ	NC	† 16Ω	NC	23Ω	19Ω	
V 14	1X2B		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 800Ω
V 15	17HP4/	0Ω	2. 2KΩ	PIN 6 0Ω	PIN 10 ▲ 10KΩ	PIN 11 † 150KΩ	PIN 12 2Ω			
	17RP4									

† MEASURED FROM OUTPUT OF M1.
▲ MEASURED FROM PIN 3 OF V13.
NC-NO CONNECTION.
TP-TIE POINT.



TUBE PLACEMENT CHART

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

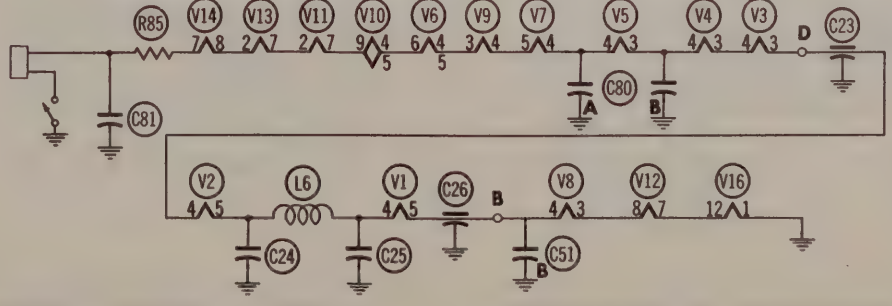
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V16**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V10**
No horiz. sync - **V10, V12**
No vert. or horiz. sync - **V7, V10**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16**
No vertical deflection - **V10, V11**
Poor vert. linearity or foldover - **V10, V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V15, M1 & M2**
Vert. off freq. - **V10**
Horiz. off freq. - **V10, V12**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See circuit below).



AIRLINE MODELS WG-4011A, B, WG-4012A, B, WG-4111A, B, C, WG-4112A, B, C, WG-5011A, B, WG-5014A, B, WG-5016A, WG-5018A, WG-5111A, B, C, WG-5114A, B, C, WG-5116A, WG-5118A (Ch. 21A39CT)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped away from the chassis. Do not remove the horizontal oscillator (V12) to disable the high voltage.
Use an isolation transformer to protect the test equipment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt bias supply to the ungrounded side of C33. Connect positive side to chassis.
Adjust sweep output to give adequate deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	44MC (10MC Swp)	47.25MC	Any non-interfering channel	Vert. Amp. thru detector probe (Fig. 1)., to pin 5 (plate) of 3CB6 (V3). Low side to chassis.	A1, A2, A3, A4	Adjust for response curve similar to Fig. 2. A1 positions the 47.25MC marker in trap notch. A2, A3 and A4 is adjusted for maximum amplitude with proper tilt and markers properly positioned as in Fig. 2.
2.	"	"	Not used	42.8MC	"	USE VTVM DC probe to point (A). Common to chassis.	A5	Adjust for maximum deflection.
3.	"	"	"	41.25MC	"	"	A6	Adjust for MINIMUM deflection.
4.	"	"	"	45.3MC	"	"	A7	Adjust for maximum deflection.
5.	"	"	"	44.0MC	"	"	A8	Adjust for maximum deflection.
6.	"	"	44MC (10MC Swp)	41.25MC 42.4MC 42.8MC 44.0MC 44.5MC 45.3MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		If response is not similar to Fig.3, make SLIGHT corrective adjustments. The position of the 44.5MC marker is critical. A8 controls the symmetry of the top. A7 controls the height of the 45.75MC marker. DO NOT readjust A2 or A3. These adjustments should only be made as outlined in Step 1.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.005MFD	High side to pin 2 (grid) of 12BY7 (Video Output). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to pin 11, (cathode) of picture tube. Common to chassis.	A9	Adjust for MINIMUM deflection.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Turn the set on and tune in a strong TV signal. Turn the buzz control (R7) 90 degrees from maximum clockwise rotation. Adjust A10 for maximum volume. Reduce the signal strength. (Remove the antenna from the antenna terminals and stray feed the signal by placing the antenna near the antenna terminals).
Adjust A11 and A12 for maximum volume. Adjust R7 for minimum noise. Reconnect antenna and readjust A10 for maximum volume. If necessary, reduce volume so this peak can be heard.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set volume control at a low volume level.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.01MFD	High side to pin 2 (grid) of 12BY7 (V6). Low side to chassis.	4.5MC (400∿Mod) (50KC Swp)	4.5MC	Any non-interfering channel	Across secondary of T5.	A10	Set buzz control (R7) 90 degrees from maximum clockwise rotation. Adjust A10 for maximum 400∿ indication on scope.
9.	"	"	"	"	"	"	A12, A11	Attenuate generator output so that signal is below limiting level of 3BN6 as evidenced by background hiss and noise. Adjust A12 and A11 for maximum 400∿ indication on scope.
10.	"	"	"	4.5MC (400∿Mod)	"	"	R7	Use a high generator output and adjust R7 for MINIMUM 400∿ indication on scope.
11.	"	"	"	4.5MC	"	"	A10	With volume control at low level, retouch A10 for maximum 400∿ indication on scope.

VHF OSCILLATOR ALIGNMENT

Connect the negative lead of a 4.5 volt bias supply to the ungrounded side. of C33. Connect the positive lead to chassis.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A13	Adjust to place sound marker in trap notch as in Fig. 4. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A14	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A15	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A16	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A17	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A18	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A19	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A20	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A21	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A22	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A23	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A24	

ALIGNMENT INSTRUCTIONS (cont)

VHF RF AND MIXER ALIGNMENT

Connect bias as under "VHF Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A25, A26, A27	Adjust for response similar to Fig. 5.
14.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 5. If markers fall below 70% on any channel make SLIGHT compromise adjustment of A25, A26 and A27 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

UHF TUNER ALIGNMENT

The UHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of the UHF portion of this set is not recommended in the field.

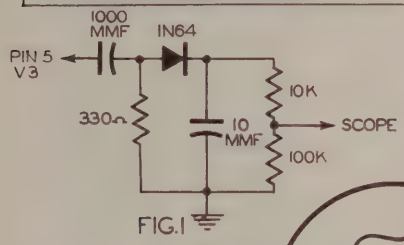


FIG.1

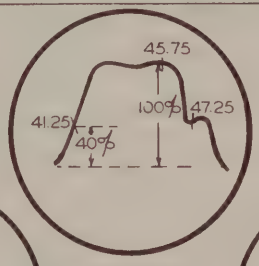


FIG.2

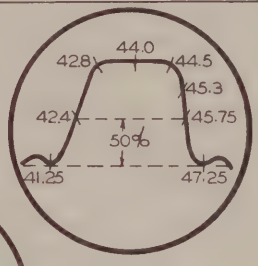


FIG.3

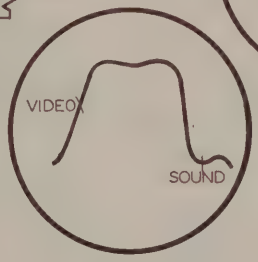


FIG.4

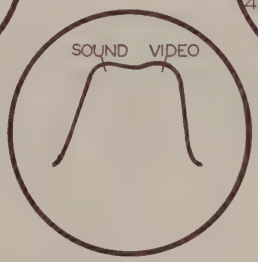
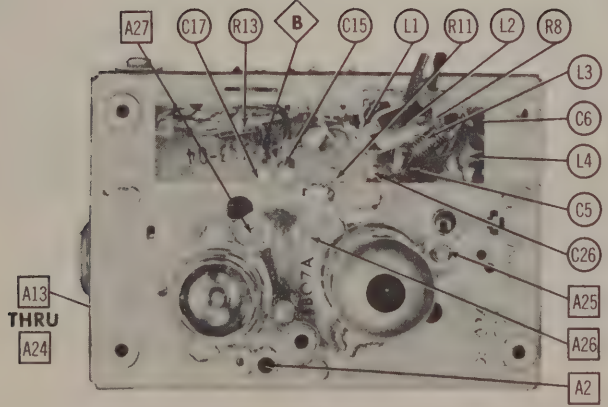
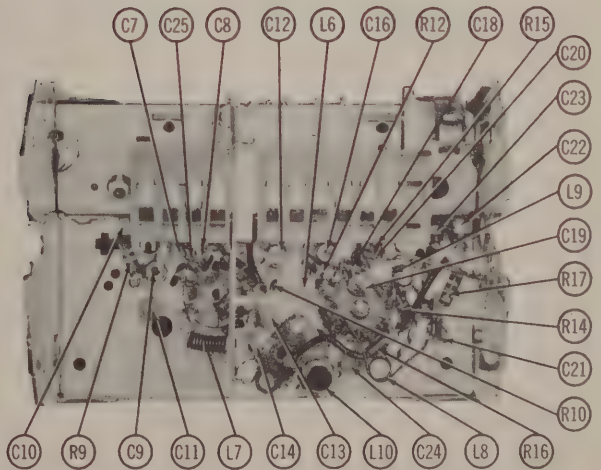


FIG.5



RF TUNER TOP VIEW

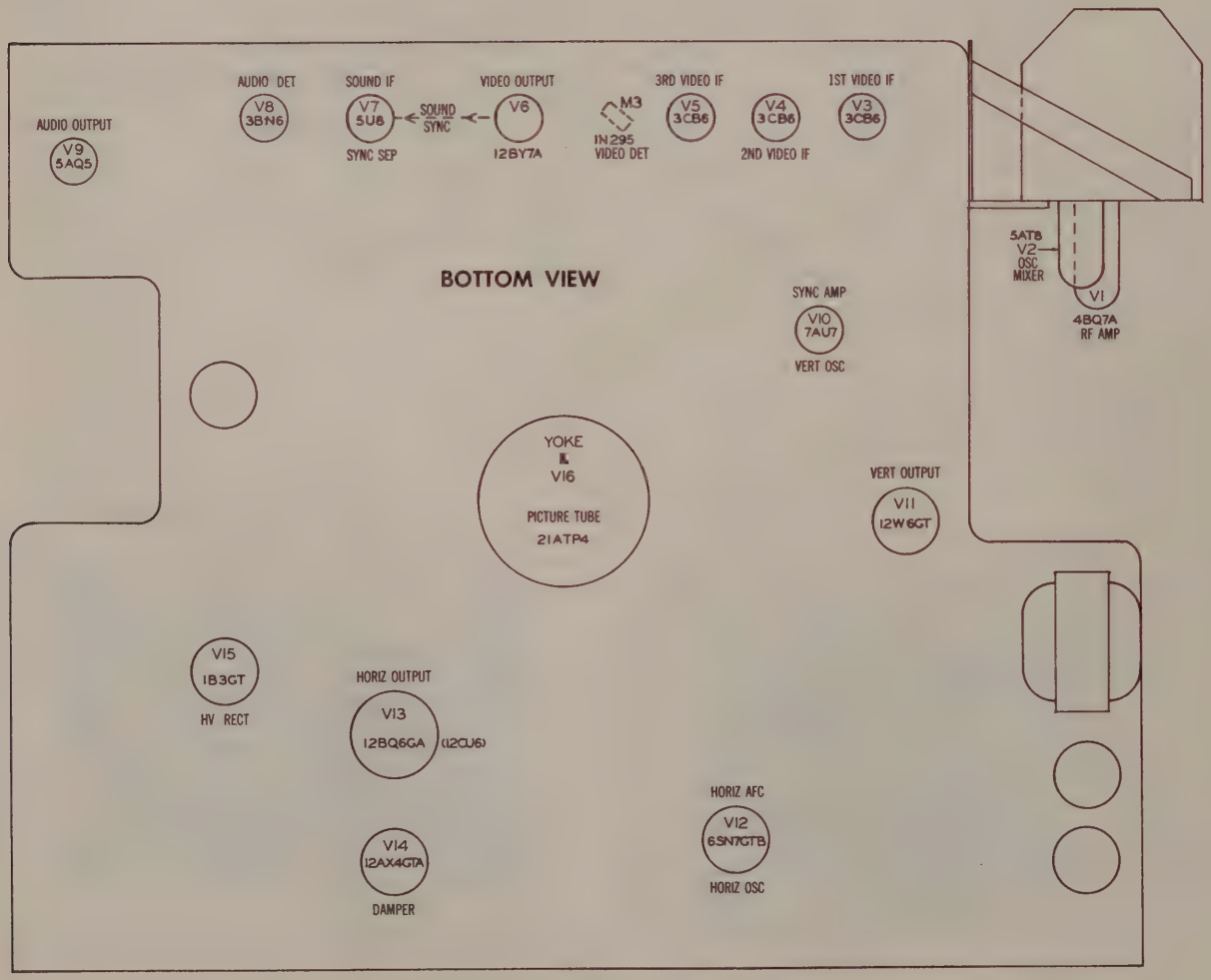


RF TUNER BOTTOM VIEW

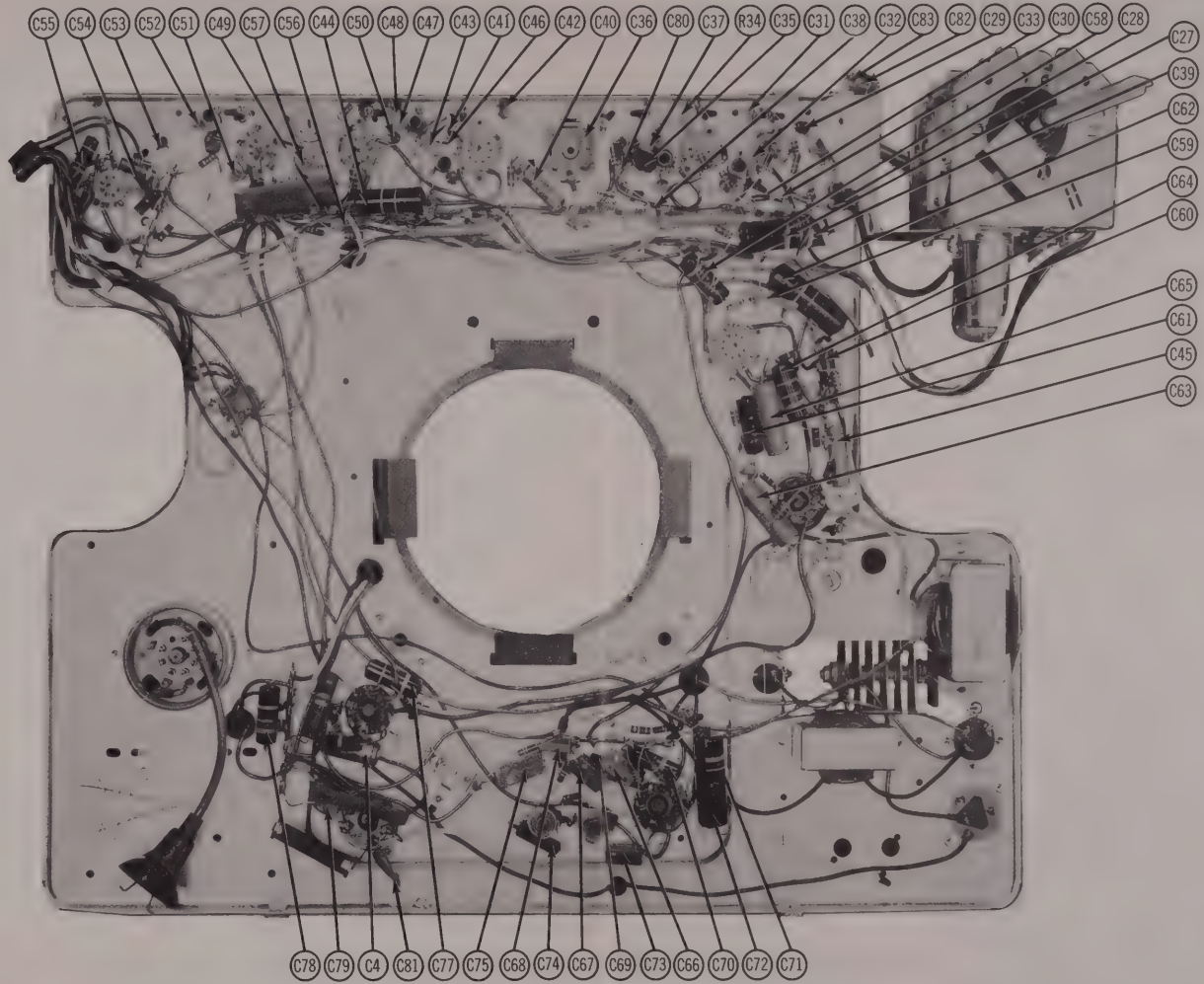
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	4BQ7A	INF	3Meg	0Ω	5Ω	4Ω	† 1KΩ	300KΩ	INF	0Ω
V 2	5AT8	10KΩ	† 8. 1KΩ	0Ω	6Ω	5Ω	† 18KΩ	† 50KΩ	0Ω	220KΩ
V 3	3CB6	1Meg	47Ω	6Ω	7Ω	† 5. 5KΩ	† 5. 5KΩ	0Ω		
V 4	3CB6	1Meg	47Ω	7Ω	8Ω	† 5. 5KΩ	† 5. 5KΩ	0Ω		
V 5	3CB6	. 2Ω	180Ω	8Ω	9Ω	† 3KΩ	† 3KΩ	0Ω		
V 6	12BY7A	260Ω	1Meg	0Ω	11Ω	11Ω	12Ω	† 3. 6KΩ	† 2. 5KΩ	0Ω
V 7	5U8	† 820KΩ	100KΩ	† 150KΩ	9Ω	10Ω	† 85KΩ	0Ω	0Ω	2. 2Meg
V 8	3BN6	250Ω	3. 6Ω	3Ω	4Ω	† 7. 2KΩ	5. 8Ω	† 330KΩ		
V 9	5AQ5	50KΩ	330Ω	11Ω	10Ω	† 900Ω	† 550Ω	50KΩ		
V 10	7AU7	▲ 2. 5Meg	1Meg	220Ω	12Ω	12Ω	† 14KΩ	47KΩ	0Ω	13Ω
V 11	12W6GT	TP	15Ω	† 450Ω	† 450Ω	2. 2Meg	NC	13Ω	1. 2KΩ	
V 12	6SN7GTB	430KΩ	† 56KΩ	0Ω	1. 4Meg	† 40KΩ	400KΩ	2Ω	3Ω	
V 13	12BQ6GA	NC	17Ω	TP	† 10 KΩ	470KΩ	TP	15Ω	100Ω	TOP CAP ▲ 10Ω
V 14	12AX4GTA	TP	NC	1Meg	NC	† 41Ω	NC	17Ω	20Ω	
V 15	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 320Ω
V 16	21ATP4	0Ω	25KΩ	PIN 6 † 100KΩ	PIN 10 ▲ 470KΩ	PIN 11 † 300KΩ	PIN 12 2Ω			

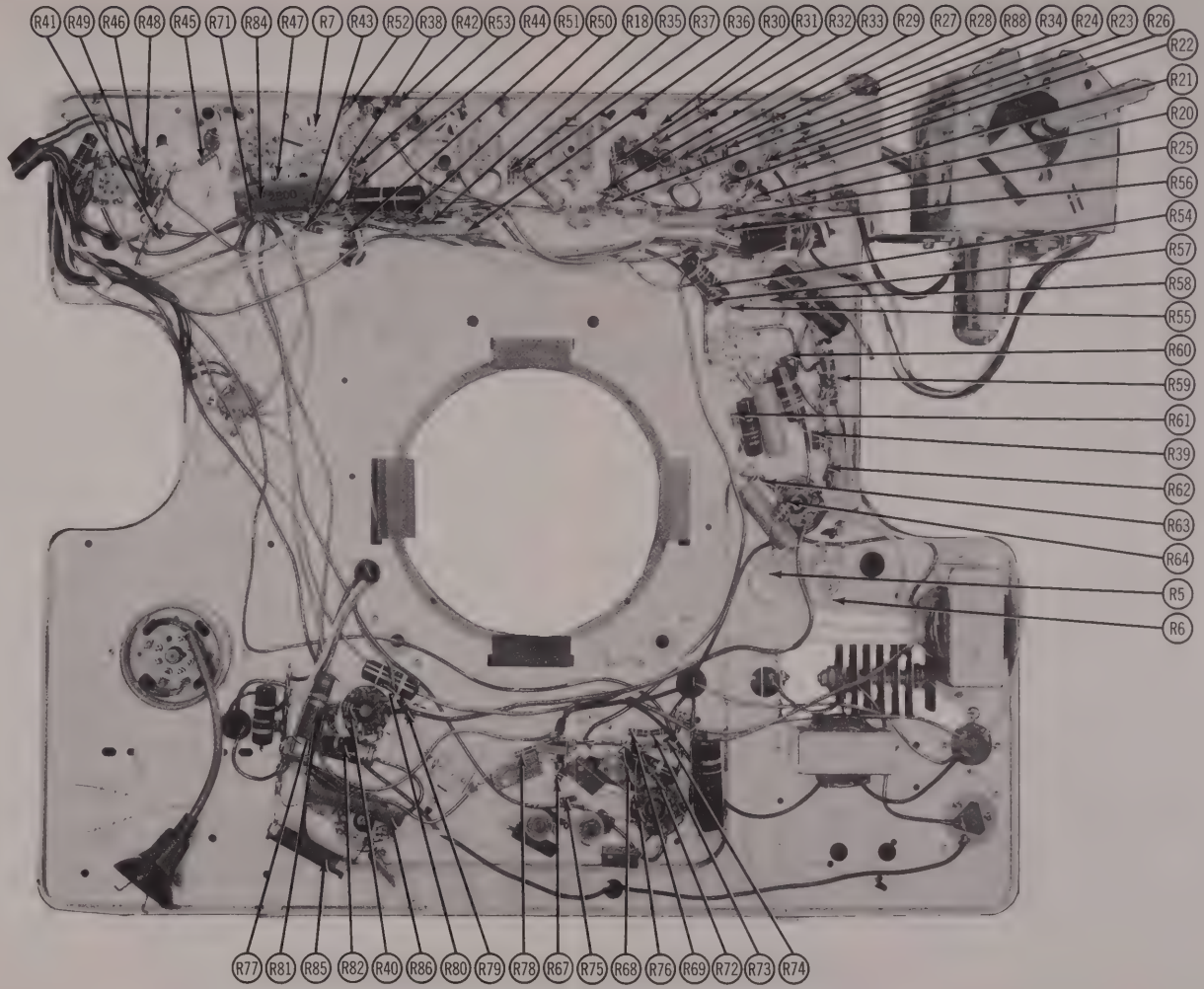
† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V14.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

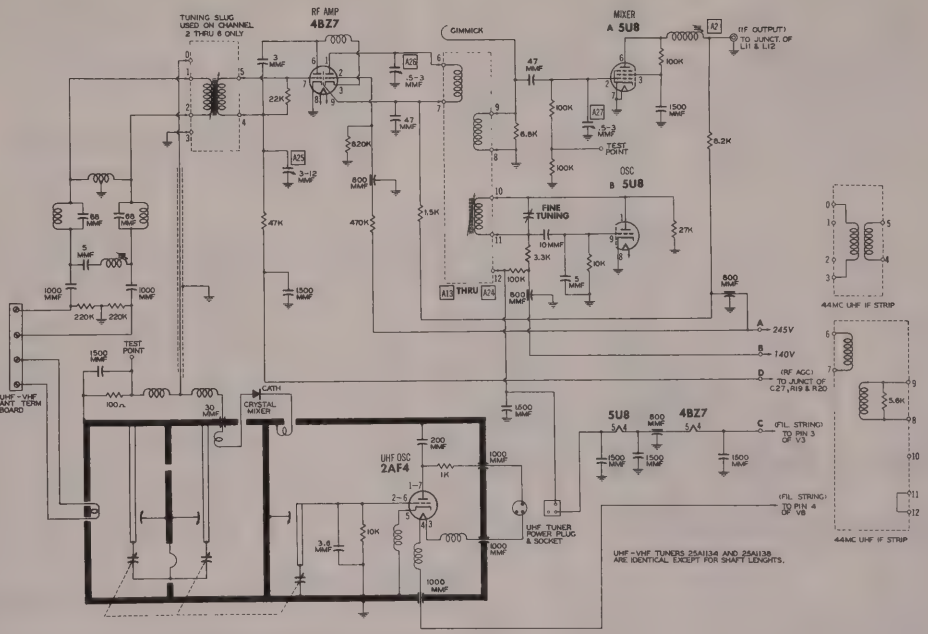


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

AIRLINE MODELS WG-4011A, B. WG-4012A, B. WG-4111A, B, C. WG-4112A, B, C. WG-5011A, B. WG-5014A, B. WG-5016A. WG-5018A. WG-5111A, B, C. WG-5114A, B, C. WG-5116A. WG-5118A (Ch. 21A39CT)

ESISTOR IDENTIFICATION

AIRLINE MODELS WG-4011A, B, WG-4012A, B, WG-4111A, B, C, WG-4112A, B, C, WG-5011A, B, WG-5014A, B, WG-5016A, WG-5018A, WG-5111A, B, C, WG-5114A, B, C, WG-5116A, WG-5118A (Ch. 21A39CT)


TUNING SLUG USED ON CHANNEL 2 THRU 6 ONLY
RF AMP 4BZ7
GIMMICK
MIXER A 5U8
OSC B 5U8
FINE TUNING
TEST POINT
(IF OUTPUT) TO JUNCT. OF L11 & L12
A 245V
B 140V
D (RF AGC) TO JUNCT. OF C27, R19 & R20
C (FIL. STRING) TO PIN 3 OF V3
(FIL. STRING) TO PIN 4 OF V8
5U8 4BZ7
UHF OSC 2AF4
CRYSTAL MIXER
UHF - VHF ANT. TERM. BOARD
UHF TUNER POWER PLUG & SOCKET
44MC UHF IF STRIP
44MC UHF IF STRIP
UHF - VHF TUNERS 25A1134 AND 25A1138 ARE IDENTICAL EXCEPT FOR SHAFT LENGTHS.

UHF - VHF TUNER 25A1134 AND 25A1138 USED WITH UHF MODELS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE UHF-VHF TUNER SCHEMATIC

ALSO USED IN MODELS WG-4011A, B, WG-4013A, B, WG-4111A, B, C, WG-4112A, B, C, WG-5011A, B, WG-5014A, B, WG-5016A, WG-5018A, WG-5111A, B, C, WG-5114A, B, C, WG-5116A, WG-5118A (Ch. 21A39CT)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L19	Shunt Peaking Coil	16Ω		36A33	19-3250 ▲	TV-185 ▲	6181 ▲	225 Microhenries, Wound on 2.2KΩ resistor
L20	1st Sound IF	3.2Ω		9A2366	20-1004	TV-151	1469	
L21	2nd Sound IF	3.6Ω	3.6Ω	9A2368	17-3495	TV-113	6203	
L22	Quadrature Coil	5.8Ω		9A2367	20-1005		1480	
L23	RF Choke	.1Ω		9A2380	19-1001		4604	1.5 Microhenries

* Parallel with 22KΩ resistor.
● Parallel with 6.8KΩ resistor.
▲ Parallel with 2.2KΩ resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L24	77Ω		9A2372			6211 ■				Tapped @ 53Ω-Horiz. Osc. Horiz. Waveform
L25	60Ω		9A2371							

■ Enlarge mounting hole.

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA: AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L26	.255A	41Ω	1HY	52X95-2	C5037 ①	C2996 ①	C2326 ①	26C41	C-17X ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: AIRLINE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.255ADC	66X14	1236A	MR300	6S300	6Q4	300	
M2	.255ADC	66X14	1236A	MR300	6S300	6Q4	300	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: SYLVANIA PART No.	NOTES
M3	1N295 *		1N60	Video Det. (Pigtail)

* Some versions may use crystal diode type CK706 or 1N60 in this application.

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M4	Tuner	25A1133	VHF - Models WG-4011A, WG-4012A, WG-5011A, WG-5014A, WG-4011B, WG-4012B, WG-5011B, WG-5014B, WG-5016A
M5	Tuner	25A1134	VHF-UHF - Models WG-4111A, WG-5111A, WG-4112A, WG-5114A, WG-5116A
	Tuner	25A1138	VHF-UHF - Models WG-4111B, WG-5111B, WG-4112B, WG-5114B, WG-4111C, WG-5111C, WG-4112C, WG-5114C
M6	Video Det. Assy.	9A2370	Includes M3, coils and capacitors
M7	Switch	2A459	Local-suburban-fringe (SP - 3 position, rotary, wafer type)
M8	Circuit Breaker	2A461	Thermal Type - Used in issue "B" and "C" - Models - later versions of models 5016A and 5116A
M9	Centering Device	2A435	Includes deflection yoke (T4) rear cover
M10	Ion Trap	2A421	
B3	Trimmer Cap.	17A271	Horiz. Drive (170-700MMF)
	Knob	S-38A40	Fine tuning - Models WG-4011A, WG-4012A, WG-5011A, WG-5014A, WG-4011B, WG-4012B, WG-5011B, WG-5014B, WG-5016A
	Knob	10A858-1	Fine tuning - Models WG-4111A, WG-5111A, WG-4112A, WG-5114A, WG-5116A
	Knob	10A858-2	Fine tuning (Mahogany) - Models WG-4111B, WG-5111B, WG-4112B, WG-5114B, WG-4111C, WG-5111C, WG-4112C, WG-5114C
	Knob	10A858-3	Fine tuning (Blond) - Models WG-4111B, WG-5111B, WG-4112B, WG-5114B, WG-4111C, WG-5111C, WG-4112C, WG-5114C
	Knob	S-38A34	High channel selector - Models WG-4111A, WG-5111A, WG-4112A, WG-5114A, WG-5116A, WG-4111B, WG-5111B, WG-4112B, WG-5114B, WG-4111C, WG-5111C, WG-4112C, WG-5114C
	Knob	10A863-1	Low channel selector - Models WG-4111A, WG-5111A, WG-4112A, WG-5114A, WG-5116A, WG-4111B, WG-5111B, WG-4112B, WG-5114B, WG-4111C, WG-5111C, WG-4112C, WG-5114C
	Knob	10A856-1	VHF channel selector - Models WG-4011A, WG-4012A, WG-5011A, WG-5014A, WG-4011S, WG-4012B, WG-5011B, WG-5014B, WG-5016A
	Knob	S-38A35	Contrast - Models WG-4011A, WG-4012A, WG-5011A, WG-5014A, WG-4011B, WG-4012B, WG-5011B, WG-5014B, WG-5016A, WG-4111B, WG-5111B, WG-4112B, WG-5114B, WG-4111C, WG-5111C, WG-4112C, WG-5114C
	Knob	S-38A36	Contrast - Models WG-4111A, WG-5111A, WG-4112A, WG-5114A, WG-5116A
	Knob	10A862-1	On-off-volume - Models WG-4011A, WG-4012A, WG-5011A, WG-5014A, WG-4011B, WG-4012B, WG-5011B, WG-5014B, WG-5016A
	Knob	10A865-1	On-off-volume - Models WG-4111A, WG-5111A, WG-4112A, WG-5114A, WG-5116A, WG-4111B, WG-5111B, WG-4112B, WG-5114B, WG-4111C, WG-5111C, WG-4112C, WG-5114C
	Knob	10A861-1	Secondary controls - All models
	Knob	10A868	Local-suburban-fringe - Not used in some versions.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	4BQ7A	4BQ7A	
V2	Mixer-Osc.	5AT8	5AT8	
V3	1st. Video IF Amplifier	3CB6	3CB6	
V4	2nd. Video IF Amplifier	3CB6	3CB6	
V5	3rd. Video IF Amplifier	3CB6	3CB6	
V6	Video Output	12BYYA	12BYYA	
V7	Sound IF Amplifier-Sync Separator	5U8	5U8	
V8	Audio Detector	3BN6	3BN6	
V9	Audio Output	5AQ5	5AQ5	
V10	Sync Amplifier-Vert. Oscillator	7AU7	7AU7	
V11	Vert. Output	12W6GT	12W6GT	
V12	Horiz. AFC-Horiz. Osc.	6SN7GTB	6SN7GTB	
V13	Horiz. Output	12BQ6GA	12BQ6GA	12CU6 may be used as an alternate
V14	Damper	12AX4GTA	12AX4GTA	
V15	HV Rectifier	1B3GT	1B3GT	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: AIRLINE PART No	CBS PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No.	NOTES
V16	21ATP4 ①	21ATP4 ①	21ATP4 ① 21ATP4A ①	21ATP4 ② 24TP4 ②	① Aluminized ② Silver screen "85"
	24TP4 ①	24TP4 ①	24TP4 ①		

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	▲140	150	45X421	AFHS1-70	XA094	FP117	TM-140-150	S-100	TVL-1428
C2A	▲125	300	45X419		B028	FP218	TM-12020-300	D-150	TVL-3588
B	▲20	300			BRB501	TC3501	TD-100-50	MTE-5010	TVA-1310
C	▲100	50							
C3A	▲125	300	45X420					Q-321.5	TVL-4634
B	▲60	300						FM-4530	TVA-1610
C	▲40	50							
C4	4	50	(Note 1)	PRS150V4	BR550	TC30	TD-4-50	MMT-0505	TVA-1303

Note 1. Some versions may use a 5MFD unit (part #45X418) in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	120		13L8V12K	BPD-00012	D6-121	TP35	GP2K-121	UC-5313	5GA-T12	
C6	5		13L8C050D	NP0-D15	TCZ-4R7	[illegible]	NP0A-050	ZT-556	5TCCB-V47	
C7	6.8		13L8C6R8I	NP0-D16.8	TCZ-6R8	[illegible]	NP0A-6R8	ZT-5568	5TCCB-V68	
C8	6.8		13L8C6R8I	NP0-D16.8	TCZ-6R8	[illegible]	NP0A-6R8	ZT-5568	5TCCB-V68	
C9	2-10		31B-901		829-10					
C10	800		13M-320EA-102ZC							
C11	2.2		13L8GP2R2C	NP0-SL2.2	TCZ-2R2	Z006	NPOA-1R5		5TCCB-V22	
C12	.5-3		31B-902		829-3		3115-01-0R5	CT565A		
C13	1000		13L8X102Z	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C14	1.5		13L8C1R5C	NP0-SL1.5	TCZ-1R5	Z004	NP0A-1R5	ZT-5515	5TCCB-V15	
C15	800		13M-320EA-102ZC							
C16	.5-3		31B-902		829-3		3115-01-0R5	CT565A		
C17	60		13M-320Q-600J							
C18	1		13D-111-2	NP0-SL1	TCZ-1	TZ03	NP0A-010		5TCCB-V1	
C19	10		13L8Q100A							
C20	30		13L8U100D							
C21	1000		13L8X102Z	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C22	800		13M-320EA-102ZC							
C23	800		13M-320EA-102ZC							
C24	1000		13L8X102Z	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C25	1000		13L8X102Z	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C26	800		13M-320EA-102ZC							
C27	10000		[illegible]	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C28	47		[illegible]	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C29	47		[illegible]	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C30	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C31	680		[illegible]	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C32	56			NP0-SI56	TCZ-56	Z036	NP0-337-560		5TCC-Q56	
C33	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C34	680		80X5	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C35	68			NP0-SI68	TCZ-68	Z038	NP0-337-680		5TCC-Q68	
C36	560			SI560	DD-561	G063	811-561	UC-5356	5GA-T56	
C37	470		[illegible]	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C38	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C39	.47	200	RCP10M2474M	P388N-47		CUB2P47		PT4047	2TM-P47	
C40	.047	200	RCP10M2473M	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C41	1000		[illegible]	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C42	47		47X603	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C43	30		47X689							
C44	.1	400	RCP10M4104M	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C45	.047	200	RCP10M2473M	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C46	1.5		47X584	NP0-SI1.5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C47	22		47X671							
C48	100		80X6	BPD-0001	DD-101	G042	801-101	UC-531	5GA-T1	
C49	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C50	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C51A	1000		80X3	BPD-2X001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	
B	1000									
C52	15		47X672							
C53	1000		80X1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C54	5000		47X507	[illegible]	[illegible]	K080	[illegible]	DC-525	[illegible]	
C55	.0047	600	RCP10M6472M	[illegible]	D6-472	CUB4D47	GP2-333-472	PT6247	6TM-D47	
C56	330	500	47X570	1469-00033	D6-331	5R5T33	811-331		MS-332	
C57	5000		47X507	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C58	.047	400	RCP10M4473M	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C59A	2000							DC-522		
B	5000		◆76X7	◆PA-120	◆PC-100	◆115TM1	◆1405-01	DC-525	◆V-1	
C	5000							DC-525		

PARTS LIST AND DESCRIPTIONS (cont)

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C60	.01	400	RCP10M4103M	BPD-01	D6-103	CUB401	GP3-333-103	PT401	4TM-S1	
C61	.022	200	RCP10M2223M	BPD-02	DD-203	CUB4S22	817-02	PT4122	4TM-S22	
C62	.1	600	RCP10M6104M	P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C63	.047	600	RCP10M6473M	BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C64	.047	400	RCP10M4473M	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C65	.1	400	RCP10M4103M	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C66	15	500	RCM20B150K	1469-00018	D6-150	5R5Q15	831-150		MS-422	
C67	82	500	RCM20B820K	1469-00062	D6-820	5R5Q82	831-820		MS-482	
C68	100	500	RCM20B101K	1469-0001	D6-101	5R5T1	801-101	MCB235	MS-31	
C69	.047	400	RCP10M4473M	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C70	.047	200	RCP10M2473M	BPD-05	DF-503	CUB2S47		PT4147	4TM-S47	
C71	.022	200	RCP10M2223M	BPD-02	DD-203	CUB4S22	817-02	PT4122	4TM-S22	
C72	.47	200	RCP10M2474M	P388N-47		CUB2P47		PT4047	2TM-P47	
C73	220	500	RCM20B221K	1469-00023	D6-221	5R5T33	811-331	MCB240	MS-322	
C74	.01	400	RCP10M4103M						4TM-S1	
C75	820	500	RCM25B821K	1464-00062		1R5T82	811-821		MS-382	
C76	220		80X10	1469-00022	D6-221	5R5T22	811-221	MCB240	MS-322	Note 2
C77	.047	400	RCP10M4473M	BPD-05	DF-503	4TM-S47		PT4147	4TM-S47	
C78	.047	400	RCP10M4473M	BPD-05	DF-503	4TM-S47		PT4147	4TM-S47	
C79	56	5000	47X756		DD60-560				75GA-Q56	
C80A	1000		80X3	BPD-2X001	DD2-102	DK069	812-001	DCD-521	5HK-2D1	
B	1000									
C81	10000	1500	47X615		DD1032					
C82	10000	1500	47X615		DD1032					
C83	1000	1500	47X573	HVD-15-1000	DD30-103	MCD1	1R5EV-102	DC-3021	20GA-D1	

Note 2. Not used in some versions.
◆ Items C59A, C59B, C59C, R58A, R58B and R58C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	78X23	F1-4		† QJ-885	UF13L	Contrast (Panel) Note 1
B	1Meg	½		R2-51			UR16L ◆	Volume (Rear)
C	Switch			KB-1			US-27 ◆	Attach to R1B.
R2A	500KΩ	½	40X394	AB-59	A47-500K-S	Q11-123	U-50	Brightness-Note 2
B	Shaft		Not Req.	AK-8 ◆	RS-3/16 ◆	NQ	D6-37 ◆	Attach to R2A.
R3A	1.5Meg	½	40X396	AB-742	A47-1.5MegS	Q11-136	U-135	Vertical Hold-Note 3
B	Shaft		Not Req.	AK-8 ◆	RS-3/16 ◆	NQ	D6-37 ◆	Attach to R3A.
R4A	50KΩ	½	40X395	AB-31	A47-50K-S	Q11-123	U-35	Horizontal Hold-Note 4
B	Shaft		Not Req.	AK-8 ◆	RS-3/16 ◆	NQ	D6-37 ◆	Attach to R4A.
R5A	1500Ω	½	40X399	AB-6	A47-1500-S	Q11-109	TAP-152L	Vertical Linearity
B	Shaft		Not Req.	AK-19	RN-3	TQ	Not Req.	Attach to R5A.
R6A	2.5Meg	½	40X398	BX-23	A492.5Meg-S	Q11-139	SU-565	Height
B	Shaft		Not Req.	Not Req.	RN-3	TQ	Not Req.	Attach to R6A.
R7	500Ω	2	40X397		39-500			Buzz (Wire Wound)

Note 1. Part No. 78X23 used in 21" UHF Models--"A" version, and 24" Models.
Note 2. Part No. 40X400 used in 24" Models.
Note 3. Part No. 40X402 used in 24" Models.
Note 4. Part No. 40X401 used in 24" Models.
* Shaft must be filed flat.
◆ Universal Replacement (Mallory Exact Duplicate Part No. UE548).
† Concentrikit Equivalent, K-4 Kit, Base Elements & Shafts; B11-108, P6- 200 (Panel) B11-137, R1-218 (Rear) 76-2 Switch

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R8	680KΩ	½	12TAE684M		
R9	4700Ω	½	12TAE472K	BTS-4700	
R10	820KΩ	½	12TAE824K	BTS-820K	
R11	470KΩ	½	12TAK474K	BTS-470K	
R12	10KΩ	½	12TAE103K		
R13	220KΩ	½	12TAE224M		
R14	10KΩ	½	12TAE103K		
R15	5600Ω	½	12TAE562K		
R16	15KΩ	½	12TAE153K		
R17	47KΩ	½	12TAE473K		
R18	1000Ω	1	C85103	BTA-1000	
R19	2.2Meg	½	B84225	BTS-2.2Meg	
R20	2.2Meg	½	B84225	BTS-2.2Meg	
R21	1000Ω	½	B85103	BTS-1000	
R22	5600Ω	½	B85562		
R23	470Ω	½	B85471	BTS-470	
R24	47Ω 5%	½	B83470	BTS-47	
R25	5000Ω	4	43X332	PW4-5000	
R26	68KΩ	½	B84683		
R27	470Ω	½	B85471	BTS-470	
R28	47Ω 5%	½	B83470	BTS-47	
R29	47KΩ	½			
R30	22KΩ	½	B84223		
R31	470Ω	½	B85471	BTS-470	
R32	180Ω	½	B84181	BTS-180	
R33	1Meg	½	B84105	BTS-1Meg	
R34	390KΩ	½	B84392	BTS-390K	
R35	1Meg	½	B84105	BTS-1Meg	
R36	3600Ω	4	43X331		
R37	47Ω	½	B84470	BTS-47	
R38	180KΩ	½	B84184	BTS-180K	
R39	15KΩ	½	B85153	BTS-15K	
R40	470KΩ	½	B84474	BTS-470K	
R41	100KΩ	½	B85104	BTS-100K	
R42	100KΩ	½	B84104	BTS-100K	
R43	82KΩ	½	B84823	BTS-82K	
R44	68KΩ	½	B84683	BTS-68K	
R45	680Ω	½	B84681	BTS-680	
R46	330KΩ	½	B84334	BTS-330K	
R47	4700Ω	1	B84472	BTS-4700	
R48	470Ω	1	C85471	BTA-470	
R49	330Ω	1	C84331	BTA-330	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R50	22KΩ	½	B84223	BTS-22K	
R51	150KΩ	½	B84154	BTS-150K	
R52	2.2Meg	½	B84225	BTS-2.2Meg	
R53	820KΩ	½	B84824	BTS-820K	
R54	680KΩ	½	B84684	BTS-680K	
R55	47KΩ	½	B84473	BTS-47K	
R56	4700Ω	½	B84472	BTS-4700	
R57	6800Ω	½	B84682	BTS-6800	
R58A	22KΩ			BTS-22K	
B	82000Ω	◆	◆76X7	BTS-8200	
C	82000Ω			BTS-8200	
R59	680KΩ	½	B84684	BTS-680K	
R60	1Meg	½	B84105	BTS-1Meg	
R61	22KΩ	½	B84223	BTS-22K	
R62	82000Ω	½	B84823	BTS-8200	
R63	2.2Meg	½	B84225	BTS-2.2Meg	
R64	680Ω	1	C84681	BTA-680	
R65	560Ω	½			
R66	560Ω	½			
R67	220KΩ	½	B84224		
R68	330KΩ	½	B84334		
R69	820KΩ	½	B84824		
R70	120KΩ	½	B84124		
R71	47KΩ	½	B84473		
R72	82KΩ	½	B84823		
R73	330KΩ	½	B84334		
R74	3900Ω	½	B84392		
R75	22KΩ	½	B84223		
R76	100KΩ	½	B84104		Note 1
R77	1Meg	½	B84105		
R78	56KΩ	½	B84563		
R79	68Ω	½	B85680		
R80	470KΩ	½	B84474		
R81	10KΩ	2	D84103		
R82	100Ω	2	D84101		
R83	5600Ω	2	B85562		
R84	25000Ω	10	43X291		1 3/4A-2500
R85	20Ω		43X329		Note 2
R86	25Ω	10	43X390		1 3/4A-25
R87	6.5Ω	20	43X393		Note 3
R88	270KΩ	½	B84274	BTS-270K	
R89	7.5Ω	5	42X380		Note 4

Note 1. Some versions use an 82KΩ ½W resistor in this application.
Note 2. Temperature compensating resistor.
Note 3. Used only in models with thermal type circuit breaker.
Note 4. Used only in models not using thermal type circuit breaker.
◆ Items R58A, R58B, R58C, C59A, C59B, C59C are combined in one unit.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: AIRLINE PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	Vert. Osc. Trans.	54X10	B6702	A-3003	209T1 ①	V405	A-8125	26A03	A-97X
T2	Horiz. Output Trans.	53X350	FB419 * ①	HVO-36 * ①	235T1 * ①	X094 * ①	A-8253 * ①	FLY-16 * ①	D-50 * ①
T3	Vert. Output Trans.	51X173	Z1900 ② ③	A-2823 ① ③		V302 ① ③	A-8142 ① ③	26B72 ① ③	A-108X ① ③
T4A	Yoke(90°) Horiz.(21MM)	9A2373-1 ④							
B	Vert. (41MM)	3A435 ⑤							

① Drill new mounting hole(s).
② Use ⅛ to 1 turns radio.
③ Connect as auto transformer.
④ Includes resistors R65 and R66.
⑤ Yoke rear cover and centering device.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	4	9	9	9	9	8	9	9
	3	7 or 5	7 or 5	7 or 5	7 or 5	2	7 or 5	7 or 5
	2	N.C. See Note ⑥	N.C. See Note ⑥	N.C. See Note ⑥	N.C. See Note ⑥	N.C. See Note ⑥	N.C. See Note ⑥	N.C. See Note ⑥
	1	1	1	1	1	4	1	1
Special Notes →		⑤	⑤	⑤	⑤	⑤	⑤	⑤

⑥ Install new damping network consisting of approximately 100MMF ⑦ 2KV, and 1000Ω ⑧ ½W, connected in series across terms #3 and #7 of horizontal yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: AIRLINE PART No.	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T5	3.5KΩ	3-4Ω	51X174	Z1001 ①	A3018 ①	A3849 ①	24B51 ①	S-51X ①	① Drill one new mounting hole.

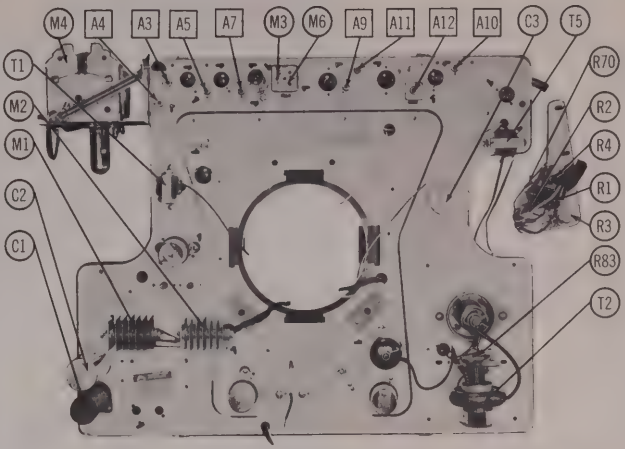
SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: AIRLINE PART No.	QUAM PART No.	RCA TYPE No	NOTES
SP1	5"	PM	3-4Ω	12A527	5A07	205S2	① Used in some versions.
	6"	PM	3-4Ω	12A528 ①	6A1	229S1	
	8"	PM	3-4Ω	12A522 ①	8A2I	208S2	

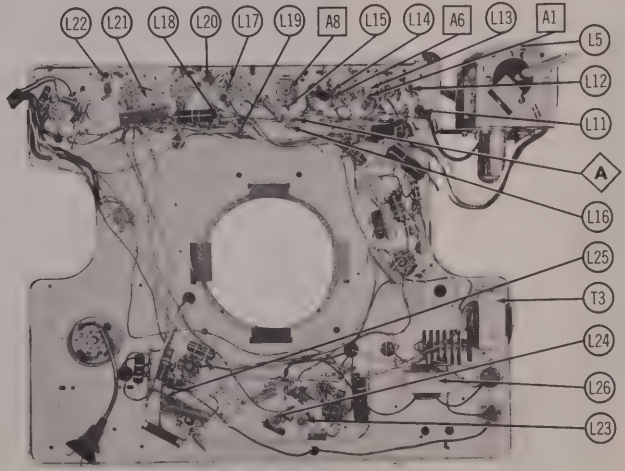
COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω	31TA-413				
L2	Ant. Matching Trans.	0Ω	0Ω	21TA-413				
L3	FM Trap	0Ω		31T-417				
L4	IF Trap Coil	.2Ω		31T-418-01				
L5A	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-302-D				Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-303-D				Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-304-D				Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-305-D				Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-306-D				Channel 6
F	Ant., RF, M Mixer Grid, Osc. Coils	0Ω		31M-307-D				Channel 7
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-308-D				Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-309-D				Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-310-D				Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-311-D				Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-312-D				Channel 12
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω		31M-313-D				Channel 13
L6	Fil. Choke	0Ω		34A-732				
L7	Neut. Coil	0Ω		31B-727				
L8	RF Coil	0Ω		21A-154-01				
L9	RF Coil	0Ω						
L10	Conv. Plate	.1Ω		31UA-506				
L11	3SMC Trap	.1Ω		9A2368		TV-183	6225	
L12	1st Video IF	.1Ω		9A2365		TV-181	6225	
L13	2nd Video IF	.2Ω	.2Ω	9A2363			6221	Includes 47.25MC Trap
L14	3rd Video IF	.2Ω	.2Ω	9A2364			6221	Includes 41.25MC Trap, R29 and C35
L15	Series Peaking Coil	5Ω		9A2376	19-3036	TV-180	6178	30 Microhenries
L16	Shunt Peaking Coil	13.5Ω		36A13	19-4180	TV-184 *	6180 *	100 Microhenries, Wound on 22KΩ resistor
L17	4.5MC Trap	3.2Ω		9A2366	20-1004	TV-181	1469	
L18	Series Peaking Coil	21Ω		36A28	19-4400 ▲	TV-190 ▲	6122 ▲	350 Microhenries, Wound on 6.5KΩ resistor

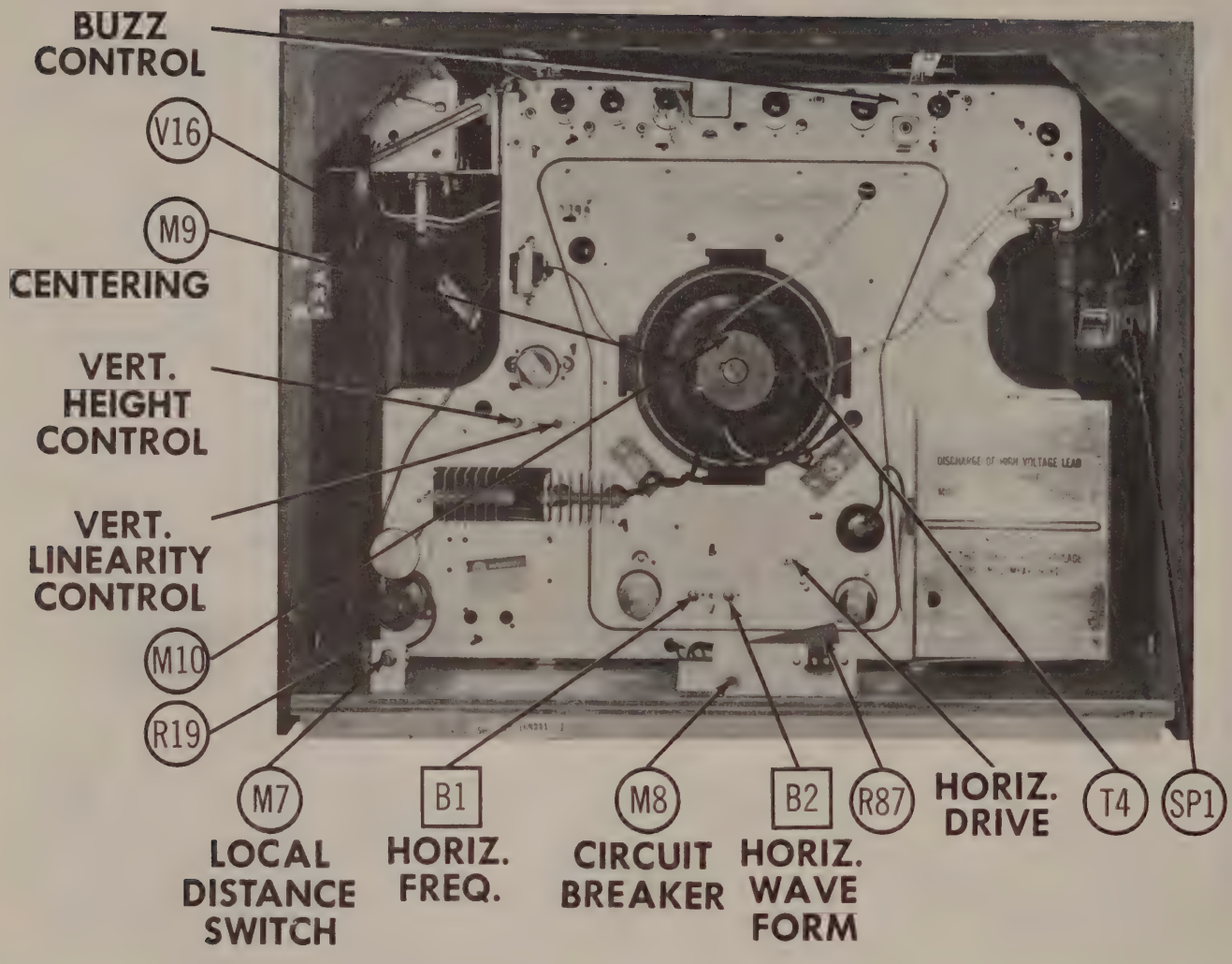
AIRLINE MODELS WG-4011A, B, WG-4012A, B, WG-4111A, B, C, WG-4112A, B, C, WG-5011A, B, WG-5014A, B, WG-5016A, WG-5018A, WG-5111A, B, C, WG-5114A, B, C, WG-5116A, WG-5118A (Ch. 21A59CT)



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENT.



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Set the contrast control for normal contrast.

1. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

2. Connect the vertical amplifier of an oscilloscope to the junction of L23 and L24 thru a 10MMF capacitor. Connect the low side to chassis. Adjust the horizontal waveform slug (B2) until waveform similar to Fig. 6 is obtained. While making this adjustment keep the picture in sync with the horizontal hold control.

3. Turn the horizontal hold control fully clockwise. Turn B1 clockwise until picture is just ready to pull-in sync.

4. Turn the horizontal hold control fully counter clockwise. Picture should remain in sync. Momentarily remove the signal by switching off the channel and back again. Retouch B1 if necessary.

5. While receiving a signal from a station, turn the contrast control fully counter clockwise, turn the brightness up so that the picture is washed out in appearance. Turn the horizontal drive control (B3) clockwise until white vertical bars appear in the left center of the raster, then slowly turn B3 counter clockwise until the white bars just disappear.

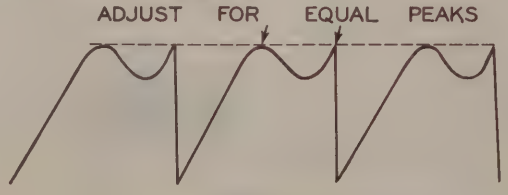


FIG. 6

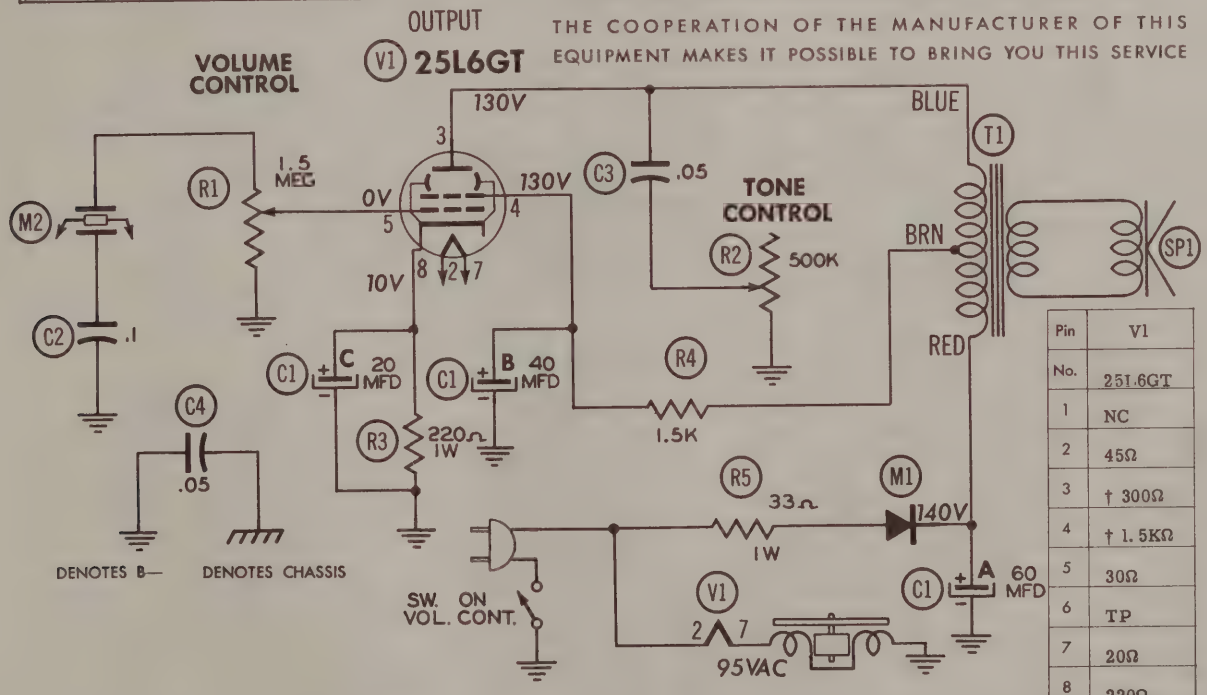
CRESCENT MODEL 604

CRESCENT MODEL 604

CRESCENT MODEL 604

TRADE NAME	Crescent Model 604
MANUFACTURER	Crescent Industries, 5900 Touhy Ave., Chicago 31, Ill.
TYPE SET	AC Operated Phono Amplifier with 3 Speed Manual Record Player
TUBES (One)	Type 25L6GT Output
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .35 Amp. @ 117 Volts AC

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE



Pin No.	V1 25L6GT
1	NC
2	45Ω
3	† 300Ω
4	† 1.5KΩ
5	30Ω
6	TP
7	20Ω
8	220Ω

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† MEASURED FROM OUTPUT OF M1.
NC-NO CONNECTION.
TP-TIE POINT.

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		CRESCENT PART No.	STANDARD REPLACEMENT	
V1	Audio Output	25L6GT	25L6GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	CRESCENT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	150		AFH3-81	CO60	FP311-1	TM-3015	T-310	TVL-3430
B	40	150							
C	20	20							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	CRESCENT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.1	600		P688N-1	DF-104	CUB6P1		PT601	6TM-P1	
C3	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C4	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CRESCENT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1.5Meg	1/2	740039			Q17-139 - 76-1		Volume Attach to R1A.
B	Switch		Not Req.					
R2A	500KΩ	1/2	740040	B-60	A47-500K-Z	Q13-133	U-48	Tone
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CRESCENT PART No.	IRC PART No.	
R3	220Ω	1		BTA-220	
R4	1500Ω	1/2		BTS-1500	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	CRESCENT PART No.	IRC PART No.	
R5	33Ω	1			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CRESCENT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.4KΩ	3.4Ω	700044	Z1102 ①	A-3031 ①	A-3336 ①	24S50A ①		① Drill one new mtg. hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	CRESCENT PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5 1/4"	PM	3.4Ω	011290	52A1	217S1	

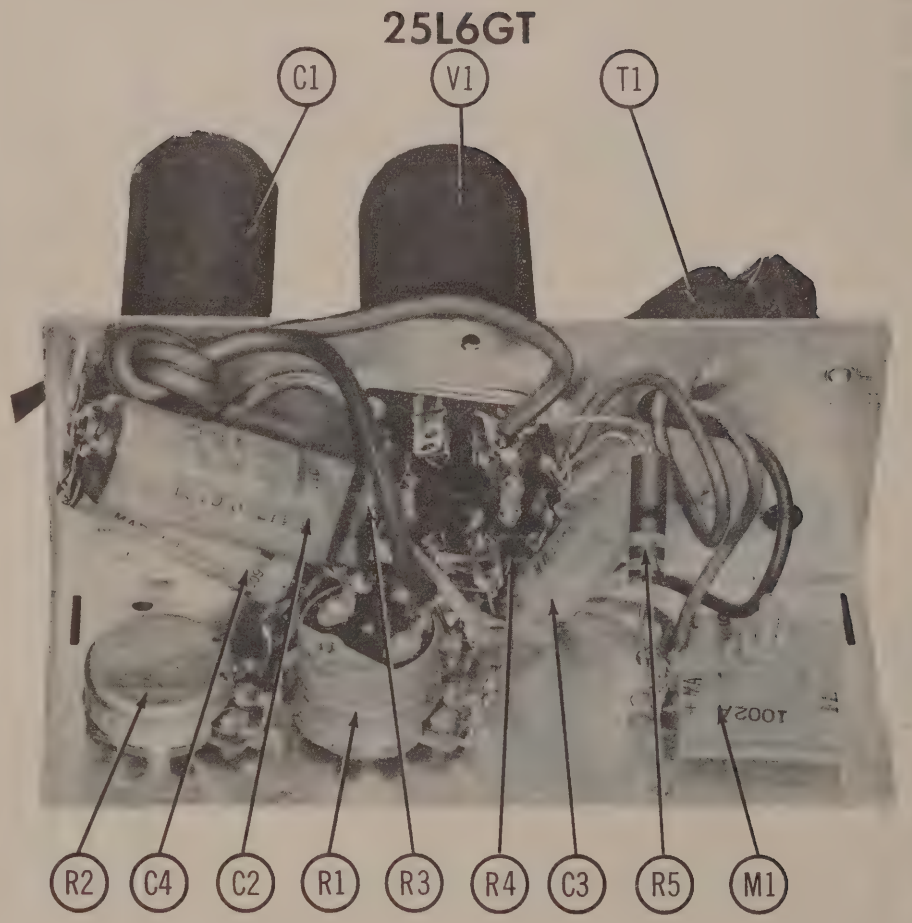
SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	CRESCENT PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.050A		1263A	RS65	6S65	8J1	65	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	CRESCENT PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2				*2460		* Complete tone arm and cartridge assembly.

CHASSIS—BOTTOM VIEW



PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	CRESCENT PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M3		* A-70 and * A-70LP	* C-430 and * A-428	* W-25A and * W-25MGA	* Metal

PHOTOFACT* Folder

*TRADE-MARK

RETMA MEMBER

GENERAL ELECTRIC MODELS 21C110, 111, 112, 113, 123, 124, 21T038, 039, 041, 042, 043, 24C180, 181, 24T070, 071 ("S" Line)

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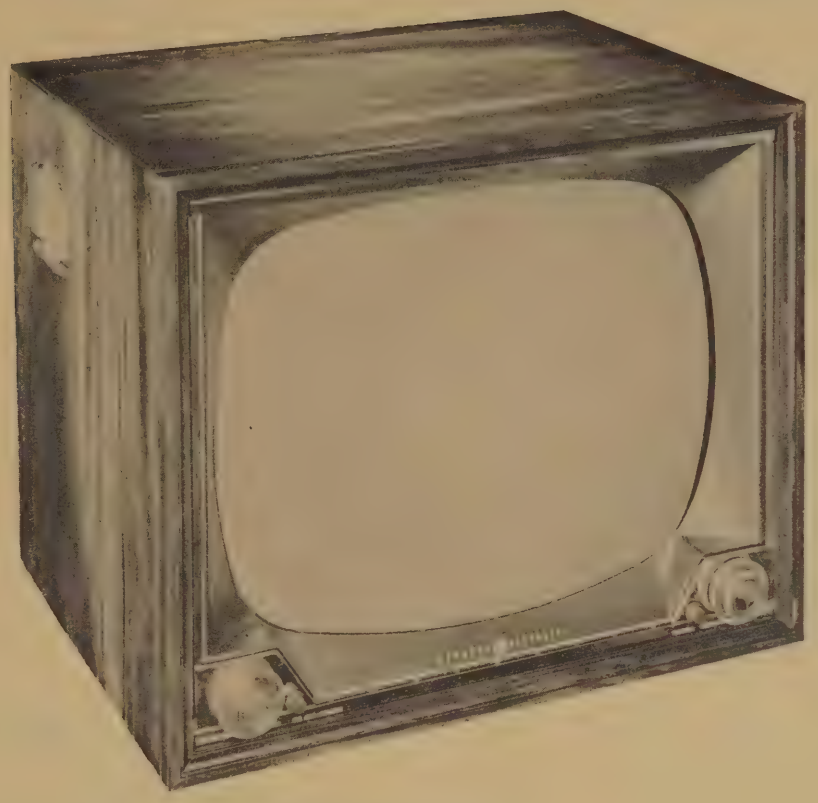

GENERAL ELECTRIC 21T042

TRADE NAME	General Electric	MODELS 21C110, 21C111, 21C112, 21C113, 21C123, 21C124, 21T038, 21T039, 21T041, 21T042, 21T043, 24C180, 24C181, 24T070, 24T071 ..... "S" Line
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.	
TYPE SET	Television Receiver	
TUBES	Seventeen	
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.6 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

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GENERAL ELECTRIC MODELS 21C110, 111, 112, 113, 123, 124, 21T038, 039, 041, 042, 043, 24C180, 181, 24T070, 071 ("S" Line)

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 6 push-on type control knobs from front panel of cabinet.

2. Loosen 2 metal screws. Remove antenna bracket.

3. Remove 8 wood screws. Remove rear cover.

4. Disconnect speaker leads. Remove 4 speaker nuts. Remove speaker.

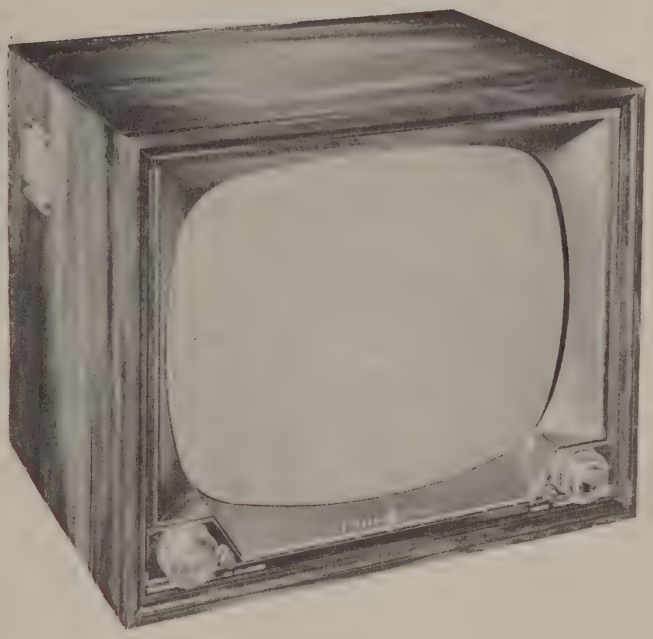
5. Remove 6 hex head bolts along edges holding mounting board to cabinet.

6. Remove hex nut holding picture tube strap to cabinet front.

7. Remove cabinet from chassis mounting board.

8. Remove picture tube socket, HV lead, ion trap, centering magnet and yoke.

9. Remove 5 chassis bolts. Remove chassis from mounting board.



MODELS

21C110, 21C111, 21C112, 21C113, 21C123, 21C124, 21T038, 21T039, 21T041, 21T042, 21T043, 24C180, 24C181, 24T070, 24T071 .. "S" Line

GENERAL ELECTRIC MODELS 21C110, 111, 112, 113, 123, 124, 21T038, 039, 041, 042, 043, 24C180, 181, 24T070, 071 ("S" Line)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear of the set. Adjust the horizontal hold slug (L38) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L36) located on tube side of chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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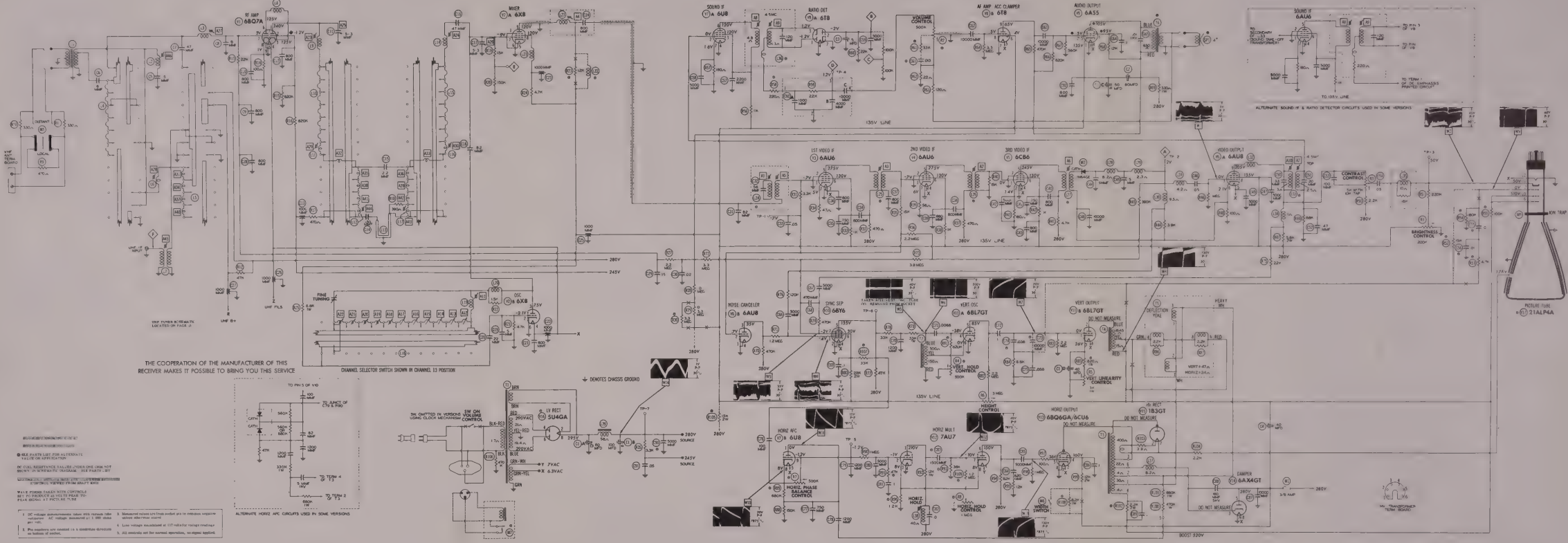

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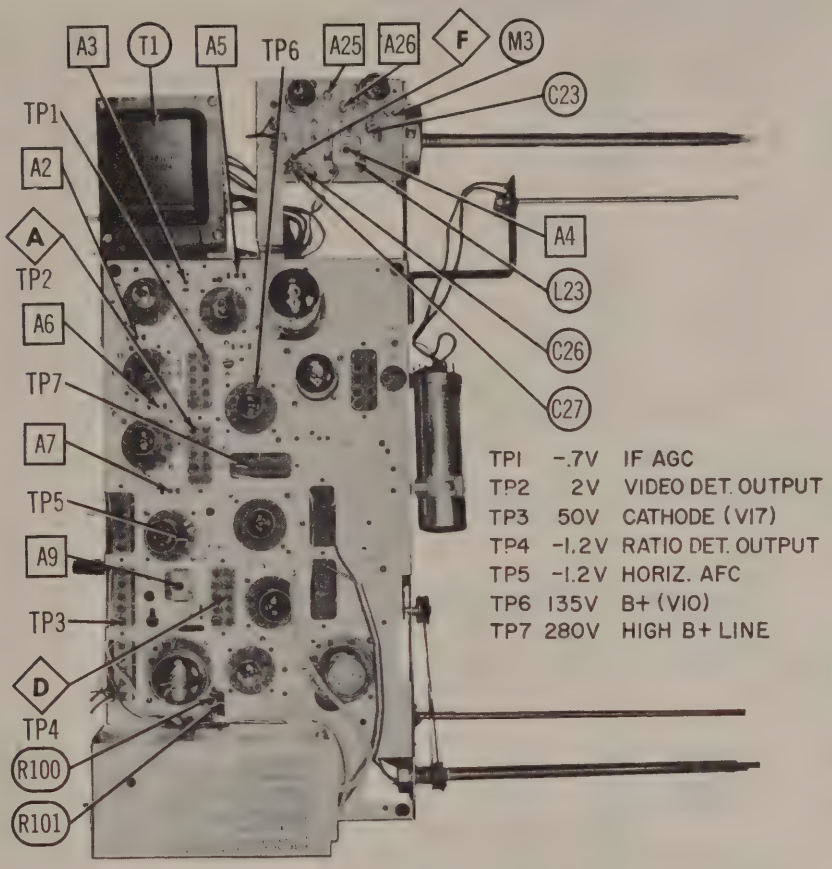
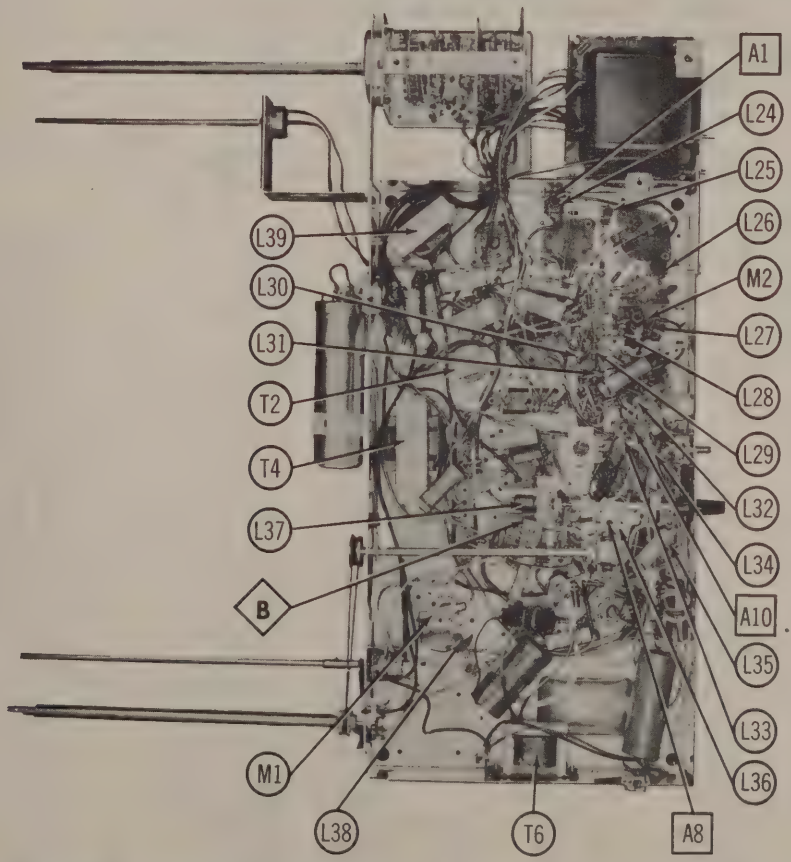
GENERAL ELECTRIC MODELS 21C110, 111, 112, 113, 123, 124, 21T038, 039, 041, 042, 043, 24C180, 181, 24T070, 071 ("S" Line)



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

SET 313 FOLDER 4

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	
V2	Mixer-Oscillator	6X8	6X8	
V3	1st. Video IF Amplifier	6AU6	6AU6	
V4	2nd. Video IF Amplifier	6AU6	6AU6	
V5	3rd. Video IF Amplifier	6CB6	6CB6	
V6	Video Output-Noise Canceller	6AU8	6AU8	
V7	Sound IF Amplifier-Horiz. AFC	6U8	6U8	
V8	Ratio Detector-AF Amplifier AGC Clamper	6T8	6T8	
V9	Audio Output	6AS5	6AH5	
V10	Sync Separator	6BY6	6BY6	
V11	Vert. Oscillator-Vert. Output	6BL7GT	6BL7GT	
V12	Horiz. Mult.	7AU7	7AU7	
V13	Horiz. Output	6BQ6GA/6CU6	6BQ6GA/6CU6	
V14	Damper	6AX4GT	6AX4GT	
V15	HV Rectifier	1B3GT	1B3GT	
V16	LV Rectifier	5U4GA	5U4GA	5U4GB may be used as an alternate

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: General Electric PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V17	21ALP4A	21ALP4A ① 21ALP4B 21ALP4 24DP4A ①	21ALP4A ① 21ALP4 24DP4A ① 24DP4	21ALP4A ② 21ALP4A/B ② 21ALP4 24DP4A ② 24DP4	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■60	350	RCE-224				TM-4139	T-115	
B	▲100	350						MT-1540	
C	▲60	200							
D	40	75							
C2	80	200	RCE-223	PRS450V80	BR8045	2N531	TD-80-350	FM-2540	TVA-1716
								FM-2540	
C3	5	50	RCE-174	PRS150V4	BR550	TC30	TD-5-50	MMT-0505	TVA-1303
C4	40	450	RCE-222	PRS450V40	BR4045	TC78	TD-40-450	FM-4540	TVA-1712

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	5			NPO-DI5	TCZ-4R7	Z011	NP0A-050	ZT-555	5TCCB-V47	
C6	6		RCW-3193							
C7	47			BPD-000047	DD-470	G033	831-470	UC-5447	5TCC-Q47	
C8	8		RCW-3194							
C9	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C10	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C11	.5-3		RCY-080		829-3		3115-01-0R5	CT565A		
C12	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C13	1000		RCW-3117							
C14	150			BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C15	2.2			NP0-SI2.2	TCZ-2R2	TZ05	NP0A-2R2		5TCCB-V22	
C16	47			BPD-000047	DD-470	G033	831-470	UC-5447	5GA-Q47	
C17	.5-3		RCY-080		829-3		3115-01-0R5	CT565A		
C18	.82		RCW-3116							
C19	5		RCW-3151							
C20	22									
C21	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C22	1000		RCW-3117							
C23	1000		RCW-3117							
C24	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C25	1000		RCW-3117							
C26	1000		RCW-3117							
C27	1000		RCW-3117							
C28	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C29	.15	200		P288N-15		CUB2P15		PT4015	2TM-P15	
C30	.02	200		BPD-02	DD-203	CUB285	817-02	PT412	2TM-S2	
C31	82		RCW-3223		TCN-82	N040	N750L-820			
C32	56		RCW-2020	NP0-SI56	TCZ-56	Z036	NP0-337-560		5TCC-Q56	
C33	.05	200		BPD-05	DF-503	CUB285		PT415	2TM-S5	
C34	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C35	750			SI750	DD-751	G066	811-751	UC-5375	5GA-T75	
C36	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C37	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C38	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C39	680			BPD-00068	DD-681	G065	811-681	UC-5368	5GA-T68	
C40	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C41	750			BPD-00075	DD-751	G066	811-751	UC-5375	5GA-T75	
C42	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C43	800			BPD-0008	DD-801	K067	831-801	DC-521	5GA-T8	
C44	5			NP0-SI5	TCZ-4R7	Z011	NP0A-050	ZT-555	5TCCB-V47	
C45	5			NP0-SI5	TCZ-4R7	Z011	NP0A-050	ZT-555	5TCCB-V47	
C46	.05	200		BPD-05	DF-503	CUB285		PT415	2TM-S5	
C47	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C48	10000		RCW-3186	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C49	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C50	33		RCW-3169	NP0-DI33	TCZ-33	Z029	NP0L-330	ZT-5433	5TCC-Q33	
C51	20			NP0-DI20	TCZ-20	Z023	NP0K-200	ZT-542	5TCC-Q2	
C52	47			NP0-DI47	TCZ-47	Z033	NP0-338-470	ZT-5447	5TCC-Q47	
C53	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C54	.05	400		BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C55	.01	1000		P1088N-01	DD-103	CUB16S1		PT1611	MB-S1	Note 2
C56	.01	1000		P1088N-01	DD-103	CUB16S1		PT1611	MB-S1	Note 2
C57	2200			HI2200	D6-222	TP57	GP2-333-222	UC-5222	5HK-D22	
C58	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C59	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C60A	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
B	4000		†REK-005	BPD-004	D6-402	K078	811-004	UC-5240	5HK-D4	
C	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C61	.015	400		BPD-015	DD16-153	CUB4S15		PT5115	4TM-S15	Note 1

PARTS LIST AND CAPACIT

ITEM No.	RATING: CAP.	RATING: VOLT	General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.
C62	10000		RCW-3186	BPD-01	DD-103
C63	10000		RCW-3186	BPD-01	DD-103
C64	.1	400		P488N-1	DF-104
C65	.01	1000		P1088N-01	DD-103
C66	5000			DI-005	DD-502
C67	5000			DI-005	DD-502
C68	470			BPD-00047	DD-471
C69	.1	400		P488N-1	DF-104
C70	1200			1464-0012	
C71	.0068	600			
C72	.1	600		P688N-1	DF-104
C73	10000			BPD-01	DD-103
C74	.036	300			
C75	.056	600			
C76	100			N750-DI100	TCN-100
C77	750			BPD-00075	DD-751
C78	1200			1464-0012	
C79	1200			1464-0012	
C80	5000			BPD-005	DD-502
C81	.1	200		P288N-1	DF-104
C82	.01	600			
C83	1500	500		1464-0015	
C84	820			1464-00082	
C85	5000			DI-005	DD-502
C86	.1	400		P488N-1	DF-104
C87	10000		RCW-3186	BPD-01	DD-103
C88	160	5000			
C89	.1	400		P488N-1	DF-104
C90	5000			BPD-005	DD-502
C91	.05	600		BPD-05	DF-503
C92	800			BPD-0008	DD-801

Note 1. Used on console models only.
Note 2. Not used in some versions.
Note 3. When C73 is used, C74 is .027MFD.
Note 4. Some versions use 1600MMF in this application (part #R
Note 5. Some versions use 800MMF in this application.
† Items C60A, C60B, C60C and R59 are combined in one unit.

CONTR

ITEM No.	RATING: RESIST-ANCE	RATING: WATTS	REPLACEMENT: General Electric PART No.	CENTRALAB PART No.	CLAROSTA PART No.
R1	200KΩ	½	RRC-344		
R2	500KΩ	½	RRC-343		
R3A	15KΩ	½	RRC-341	♦ ABT-154	
B	Shaft		Not Req.	AK-9	
C	Coupler		Not Req.	AK-16	
R4A	500KΩ	½	RRC-348	♦ AB-59	
B	Shaft		Not Req.	AK-9	
C	Coupler		Not Req.	AK-16	
R5	3000Ω	1	RRC-305		39-3000
R6A	3Meg	½	RRC-301	AB-84	A47-3Meg-
B	Shaft		Not Req.	AK-1	FKS-1/4
R7A	500KΩ	½	RRC-321	BX-59	A47-500K-
B	Shaft		Not Req.	Not Req.	FKS-1/4
R8	1Meg	½	RRC-366		

Note 1. This control used in all table models of the "S" Line Chas
Part. No. RRC-346 used in Model 21C113.
Part No. RRC-347 used in all console and Loboy Models
♦ Saw off shaft of original control, and connect to the sh
Note 2. This control used in all 21" table models, and Models 21C
Part No. RRC-349 used in Loboy and 24" models.
Part No. RRC-350 used in Model 21C113.
Note 3. This control is not used in late and mid-production mode
Note 4. This control is used only in late and mid-production mode

RESISTO

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R9	470Ω	½		BTS-470	
R10	330Ω	½		BTS-330	
R11	330Ω	½		BTS-330	
R12	47KΩ	½		BTS-47K	
R13	22KΩ	½			
R14	100Ω	½		BTS-100	
R15	820KΩ	½		BTS-820K	
R16	820KΩ	½		BTS-820K	
R17	470Ω	½		BTS-470	
R18	390Ω	½		BTS-390	
R19	15KΩ	½			
R20	150KΩ	½			
R21	47000Ω	½			
R22	1500Ω	½			
R23	1200Ω	½			Note 2
R24	4700Ω	½			
R25	6800Ω	1		BTA-6800	
R26	3300Ω	½		BTS-3300	
R27	2.2Meg	½		BTS-2.2Meg	
R28	10Meg 5%	½		BTS-10Meg5%	
R29	3.3Meg	½		BTS-3.3Meg	Note 1
R30	3.3Meg	½		BTS-3.3Meg	Note 1
R31	3300Ω	½			
R32	470Ω	½		BTS-470	
R33	1000Ω	½		BTS-1000	
R34	47Ω	½		BTS-47	
R35	15KΩ	½			
R36	2.2Meg	½			
R37	470Ω	½		BTS-470	
R38	1000Ω	½		BTS-1000	
R39	56Ω	½		BTS-56	
R40	15KΩ	½			
R41	4700Ω	½			
R42	1000Ω	½		BTS-1000	
R43	180Ω	½		BTS-180	
R44	3900Ω	½		BTS-3900	
R45	390KΩ	½		BTS-390K	
R46	1Meg	½		BTS-1Meg	
R47	5600Ω	2		BTB-5600	
R48	100Ω	½		BTS-100	
R49	68KΩ	½		BTS-68K	
R50	2200Ω	½		BTS-2200	

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	
V2	Mixer-Oscillator	6X8	6X8	
V3	1st. Video IF Amplifier	6AU6	6AU6	
V4	2nd. Video IF Amplifier	6AU6	6AU6	
V5	3rd. Video IF Amplifier	6CB6	6CB6	
V6	Video Output-Noise Cancelar	6AU8	6AU8	
V7	Sound IF Amplifier-Horiz. AFC	6U8	6U8	
V8	Ratio Detector-AF Amplifier AGC Clamper	6T8	6T8	
V9	Audio Output	6A8S	6A8S	
V10	Sync Separator	6BT8	6BT8	
V11	Vert. Oscillator-Vert. Output	6BL7GT	6BL7GT	
V12	Horiz. Mult.	7AU7	7AU7	
V13	Horiz. Output	6BQ6GA/6CU6	6BQ6GA/6CU6	
V14	Damper	5AX4GT	5AX4GT	
V15	HV Rectifier	1B3GT	1B3GT	
V16	LV Rectifier	5U4GA	5U4GB	5U4GB may be used as an alternate

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: General Electric	CBS PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No	NOTES
V17	21ALP4A	21ALP4A ①	21ALP4A ①	21ALP4A ② ③	① Aluminized
		21ALP4B		21ALP4A ③	② Silver screen "88"
		21ALP4	21ALP4	21ALP4	
		24DP4A ①	24DP4A ①	24DP4A ②	
				24DP4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A							TM-4139	T-115 MT-1540	
B									
C									
D									
C2	80	300	RCE-224	PRS450Y80	BR8045	2N521	TD-80-350	FM-3540 FM-2540	TVA-1716
C3	5	50	RCE-174	PRS150Y4	BR550	TC30	TD-5-50	MMT-0505	TVA-1203
C4	40	450	RCE-222	PRS450Y40	BR4045	TC79	TD-40-450	FM-4540	TVA-1713

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	5			NPO-D15	TCZ-4ET	20U	NPOA-050	ET-555	5TCCB-V47	
C6	6		RCW-3193							
C7	47			BPD-0000047	DD-470	G033	S31-470	UC-5447	9WCC-Q47	
C8	8		RCW-3184							
C9	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C10	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C11	.5-3		RCT-080				S11S-01-0125	C7585A		
C12	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C13	1000		RCW-3117							
C14	150			BPD-00015	DD-151	G046	S11-151	UC-5215	5GA-T15	
C15	2.2			NPO-E22.2	TCZ-2R2	T205	NPOA-2R2		5TCCB-Y22	
C16	47			BPD-0000047	DD-470	G033	S31-470	UC-5447	5GA-Q47	
C17	.5-3		RCT-080				S11S-01-0125	C7585A		
C18	800		RCW-3118							
C19	5		RCW-3151							
C20	33									
C21	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C22	1000		RCW-3117							
C23	1000		RCW-3117							
C24	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C25	1000		RCW-3117							
C26	1000		RCW-3117							
C27	1000		RCW-3117							
C28	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C29	.15	200		P388N-15		CU5EP15		PT401S	2TM-P15	
C30	.02	200		BPD-03	DD-203	CU5E5	S17-03	PT413	2TM-S3	
C31	68		RCW-3223		TCZ-68	N040	NT60J-820			
C32	56		RCW-3080	MPO-S15S	TCZ-56	Z036	MPO-337-560		5TCC-Q56	
C33	.05	200		BPD-05	DF-503	CU5E5		PT415	2TM-S5	
C34	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C35	750			S1T50	DD-751	G066	S11-751	UC-5375	5GA-T75	
C36	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C37	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C38	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C39	680			BPD-00068	DD-681	G06S	S11-681	UC-5368	5GA-T68	
C40	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C41	750			BPD-00075	DD-751	G065	S11-751	UC-5375	5GA-T75	
C42	5000			BPD-005	DD-502	K060	S11-005	DC-525	5HK-D5	
C43	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	
C44	5			NPO-S15	TCZ-4R7	20U	NPOA-050	ET-555	5TCCB-V47	
C45	5			NPO-S15	TCZ-4R7	20U	NPOA-050	ET-555	5TCCB-V47	
C46	.05	300		BPD-05	DF-503	CU5E5		PT415	2TM-S5	
C47	5000			BPD-005	DD-502	K060	S11-005	DC-525	5HK-D5	
C48	10000		RCW-3186	BPD-01	DD-103	K062	S11-01	DC-511	5HK-S1	
C49	5000			BPD-005	DD-502	K060	S11-005	DC-525	5HK-D5	
C50	33		RCW-3189	MPO-D133	TCZ-33	Z029	NPO1-330	DC-5433	5TCC-Q33	
C51	50			MPO-D150	TCZ-50	Z031	NPOE-500	ZT-543	5TCC-Q50	
C52	47			MPO-D147	TCZ-47	Z028	NPO-338-470	ZT-5447	5TCC-Q47	
C53	100			SU100	D6-101	TP34	GPSK-101	UC-531	5GA-T1	
C54	.05	400		BPD-05	DF-503	CU5E5		PT415	4TM-S5	
C55	.01	1000		P1S8N-01	DD-103	CU5S81		PT151	MB-S1	Note 3
C56	.01	1000		P1S8N-01	DD-103	CU5S81		PT151	MB-S1	Note 3
C57	3300			SI330S	D6-332	TP57	GPS-333-223	UC-5323	5HK-D33	
C58	5000			BPD-005	DD-502	K060	S11-005	DC-525	5HK-D5	
C59	5000			BPD-005	DD-502	K060	S11-005	DC-525	5HK-D5	
C60A	1000			BPD-001	DD-102	K059	901-001	DC-521	5HK-D1	
B	4000		†RKE-006	BPD-004	DE-402	K070	S11-004	UC-5340	5HK-D4	
C	10000			BPD-01	DD-103	K062	S11-01	DC-511	5HK-S1	
C61	.015	400		BPD-015	DD16-153	CU5E415		PT411S	4TM-S15	Note 1

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C62	10000		RCW-3186	BPD-01	DD-103	K062	S11-01	DC-511	5HK-S1	
C63	10000		RCW-3186	BPD-01	DD-103	K062	S11-01	DC-511	5HK-S1	
C64	.04	400		P488N-1	DF-104	CU5P41		PT401	4TM-P1	
C65	.01	1000		P1S8N-01	DD-103	CU5S81		PT151	MB-S1	
C66	5000			BPD-005	DD-502	K060	S11-005	DC-525	5HK-D5	
C67	5000			BPD-005	DD-502	K060	S11-005	DC-525	5HK-D5	
C68	470			P488N-1	DF-104	CU5P41		PT401	4TM-P1	
C69	.1	400		1464-0013		1R5S15	S11-123		MS-S15	
C70	1500									
C71	.0068	600								
C72	.1	600		P488N-1	DF-104	CU5P41		PT401	6TM-P1	
C73	10000			BPD-01	DD-103	K062	S11-01	DC-511	5HK-S1	Note 3
C74	.056	300								Note 3
C75	.056	600								
C76	100			NT50-D100	TCN-100	N042	NT50J-101	NT-521	5TCU-T1	
C77	750			BPD-00075	DD-751	G066	S11-751	UC-5375	5GA-T75	
C78	1200			1464-0012		1R5D12	S11-122		MS-S12	
C79	1200			1464-0012		1R5D12	S11-122		MS-S12	
C80	5000			BPD-008	DD-502	K060	S11-005	DD-502	5HK-D5	
C81	.1	300		P588N-1	DF-104	CU5E5P1		DF-104	3TM-P1	
C82	.01	600								
C83	1500	500				1R5Y15		MCE456	MS-S15	Note 4
C84	820			1464-00082S		1R5T82	S11-821		MS-S82	
C85	8000			DE-008	DD-502	K060	S11-005	DC-525	5HK-D5	
C86	.1	400		P488N-1	DF-104	CU5P41		PT401	4TM-P1	
C87	10000		RCW-3186	BPD-01	DD-103	K062	S11-01	DC-511	5HK-S1	
C88	150	5000								
C89	.1	400		P488N-1	DF-104	CU5P41		PT401	4TM-P1	
C90	5000			BPD-005	DD-502	K060	S11-005	DC-525	5HK-D5	Note 5
C91	.05	600		BPD-05	DF-503	CU5E5		PT415	6TM-S5	
C92	800			BPD-0008	DD-801	K067	S31-801	DC-521	5GA-T8	

Note 1. Used on console models only.
Note 2. Not used in some versions.
Note 3. When C75 is used, C74 is .027MFD.
Note 4. Some versions use 1800MMF in this application (part #RCU-341).
Note 5. Some versions use 8000MMF in this application.
† Items C60A, C60B, C90C and R59 are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: General Electric PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	200KΩ		RHC-344					Brightness
R2	500KΩ		RHC-343					Volume & Switch-Note 1
R3A	15KΩ		RHC-341	✶ A8T-154		✶ Q1S-118X		Contrast Tapped at 10KΩ
B	Shaft		Not Req.	A8-9		Not Req.		Attach to R3A.
C	Coupler		Not Req.	AK-16		C-3		Attach to R3B.
R4A	500KΩ	½	RHC-348	✶ A8-59		✶ Q1-123		Vertical Hold-Note 2
B	Shaft		Not Req.	A8-9		Not Req.		Attach to R4A.
C	Coupler		Not Req.	AK-16		C-3		Attach to R4B.
R5	3500Ω	1	RHC-305		2S-3000			Vertical Linearity (Wire Wound)
R6A	3Meg	½	RHC-301	A8-84	A47-3Meg-S	Q11-140	8U-59	Height
B	Shaft		Not Req.	AK-1	FKS-1/4	7Q	Not Req.	Attach to R6A.
R7A	2.5MΩ	½	RHC-321	A8-59	A47-2.5Meg-S	S11-133	8U-50	Horiz. Phase Balance-Note 3
B	Shaft		Not Req.	Not Req.	FKS-1/4	TM-1 Kit	Not Req.	Attach to R7A.
R8	1Meg		RHC-366					Horiz. Hold-Note 4

Note 1. This control used in all table models of the "S" Line Chassis.
Part. No. RHC-346 used in Model 21C113.
Part No. RHC-347 used in all console and Lobby Models with the exception of Model 21C113.
Part No. RHC-349 used in Lobby and 24" models.
Use of shaft of original control, and connect to the shaft of the new control with coupler.

Note 2. This control used in all 21" table models, and Models 21C110, 21C111, and 21C112.
Part No. RHC-349 used in Lobby and 24" models.
Part No. RHC-350 used in Model 21C113.

Note 3. This control is not used in late and mid-production models.

Note 4. This control is used only in late and mid-production models.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R9	470Ω	½		BTS-470	
R10	33KΩ	½		BTS-330	
R11	23KΩ	½		BTS-230	
R13	47KΩ	½		BTS-47K	
R23	22KΩ	½			
R14	100Ω	½		BTS-100	
R15	820KΩ	½		BTS-830K	
R16	820KΩ	½		BTS-830K	
R17	47KΩ	½		BTS-470	
R18	39KΩ	½		BTS-390	
R19	15KΩ	½			
R20	150KΩ	½		BTS-151	
R21	4700Ω	½			
R22	1500Ω	½			
R23	1200Ω	½			Note 2
R24	470Ω	½			
R25	6800Ω	½		BTA-6800	
R26	330Ω	½		BTS-3300	
R27	2.2Meg	½		BTS-2.2Meg	
R28	10Meg 5%	½		BTS-10Meg5%	
R29	3.3Meg	½		BTS-3.3Meg	Note 1
R30	3.3Meg	½		BTS-3.3Meg	Note 1
R31	3300Ω	½			
R32	470Ω	½		BTS-470	
R33	1000Ω	½		BTS-1000	
R34	47Ω	½		BTS-47	
R35	15KΩ	½			
R36	2.2Meg	½			
R37	470Ω	½		BTS-470	
R38	1000Ω	½		BTS-1000	
R39	56Ω	½		BTS-56	
R40	15KΩ	½			
R41	4700Ω	½			
R42	1000Ω	½		BTS-1000	
R43	180Ω	½		BTS-180	
R44	3900Ω	½		BTS-3900	
R45	330KΩ	½		BTS-330K	
R46	1Meg	½		BTS-1Meg	
R47	5600Ω	3		BTS-5600	
R48	100Ω	½		BTS-100	
R49	68KΩ	½		BTS-68K	
R50	2200Ω	½		BTS-2200	
R51	220KΩ	½		BTS-220K	
R52	18KΩ	½		BTS-180	Note 2
R53	4700Ω	½		BTS-4700	Note 2
R54	180KΩ	½		BTS-180K	Note 2
R55	100KΩ	½		BTS-1006	Note 2
R56	1000Ω	½		BTS-1000	
R57	180Ω	½		BTS-180	
R58	220Ω	½		BTS-220	Note 4
R59	22KΩ	½		BTS-22K	
R60	22KΩ	½		BTS-22K	
R61	33KΩ	½		BTS-33K	Note 2
R62	22Ω	½		BTS-22	
R63	120Ω	½		BTS-120	
R64	3.3Meg	½		BTS-3.3Meg	
R65	470KΩ	½		BTS-470K	
R66	620K 5%	½	URD-1116	BTS-620K 5%	
R67	680KΩ 5%	½	URD-1115	BTS-680K	
R68	12KΩ	½		BTS-12K	
R69	330Ω	1		BTA-330	
R70	470KΩ	½		BTS-470K	
R71	1.2Meg	½		BTS-1.2Meg	
R72	5.3Meg	½		BTS-3.3Meg	
R73	3.9Meg	½		BTS-3.9Meg	
R74	470KΩ	½		BTS-470K	
R75	22KΩ	½		BTS-22K	
R76	120KΩ	½		BTS-120K	
R77	47KΩ	½		BTS-47K	
R78	33KΩ	½		BTS-33K	
R79	33KΩ	½		BTA-33K	
R80	33KΩ	3		BTS-33K	
R81	820K	½		BTS-820K	Note 5
R82	2.2Meg	½		BTS-2.2Meg	
R83	2.2Meg	½		BTS-2.2Meg	
R84	6800Ω	½		BTS-6800	
R85	8200 5%	½		BTA-820 5%	Note 6
R86	2200Ω	½			
R87	2200Ω	½			
R88	150KΩ	½			
R89	680KΩ	½			
R90	1Meg	½			
R91	47KΩ	½			Note 10
R92	12KΩ	½			

RESISTORS (cont)

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R93	39KΩ 5%	½			Note 7, 11
R94	82KΩ	½			
R95	12KΩ	½			
R96	120KΩ	½			Note 8
R97	100Ω	½			
R98	1Meg	½			
R99	12KΩ	½			
R100	470KΩ	½			
R101	680KΩ	½			
R102	2200Ω	2		RRW-129	Note 9
R103	5.6Ω	3			
R104	2300Ω	½			
R105	15KΩ	3			Note 8
R106	470KΩ	½			
R107	33KΩ	½			Note 2
R108	8200Ω	½			Note 12
R109	1.2Meg	½			Note 2

Note 1. In some versions R29 and R30 are replaced with a single 2.2Meg ½W resistor.
Note 2. Not used in some versions.
Note 3. Some versions use a 470KΩ 1W resistor in this application.
Note 4. In models using ratio detector transformer RTD-023, this resistor is a part of this assembly.
Note 5. Some versions use a 1Meg 1W resistor in this application.
Note 6. Some versions use a 1KΩ 1W resistor in this application.
Note 7. Some versions use a 30KΩ 1W 5% resistor in this application (Mfgr. Part No. URD-1064).
Note 8. Some versions use a 150Ω 1W resistor in this application.
Note 9. Some versions use a 47000 1W resistor in this application.
Note 10. Some versions use a 120KΩ 1W resistor in this application.
Note 11. Some versions use a 36KΩ 1W resistor in this application.
Note 12. Used in models using a width switch and may range between 2000Ω 1W to 8200Ω 1W for proper width.
† Items R59, C60A, C60B, C90C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: General Electric PART No	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	117VAC	550VCT	5VAC	6.3VAC	RTP-331					
	@ 1.8A	@ .220A	@ 3A	@ .475A 6.3V @ 6.5A						

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	Halldorson PART No	Merit PART No	RCA TYPE No	Rom PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Vert. Osc. Trans.	RLC-137	B6705 ①	A-3004 ①		V404 ① ②	A-8126 ①	26A02 ①	A-120Z ①
T3	Horiz. Output Trans.	RTO-179							
T4	Vert. Output Trans.	RTO-167	21804	A-3037	222TI	V313	A-8123	26B52	A-102X
T5A	Yoke (90°)Horiz.(12MH)	RDL-069 ③	DF606 ④	MDF-91 ④	237DI ④	T90P12/47 ④	DY-13A ④	Y-16 ④ ⑤	Y-60-1 ④
B	Vert. (48MH)					⑤ ⑥		⑤ ⑥	⑤ ⑥

① Connect red and yellow leads to cathode, blue to ground, and green to grid capacitor CT.
② Drill new mounting hole(s).
③ Does not include yoke plug General Electric Part No. RJP-063, nor leads.
④ Use original yoke mounting clamp.
⑤ Connect terminal #3 of yoke to horizontal output transformer terminal #2; yoke terminal #1 to horizontal output transformer terminal #1.
⑥ Connect horizontal damping network across yoke terminals #3 and #7.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC	REPLACEMENT DATA: General Electric PART No.	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T6	6KΩ	3.5Ω	RTO-139 ① RTO-140 ② RTO-181 ③	Z1004	A2930	A3850	26S80	S-51X	① Used in table models. ② Used in console models. ③ Used in lobby models.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: General Electric PART No.	QUAM PART No.	RCA TYPE No	NOTES
SP1	4"	PM	3.8Ω	S-403D ①	4A07	223SI	① Used in Models 21T038, 21T039, 21T041.
	5 1/4"	PM		S-527D ②	5A41	215SI	21T043, 21T045.
	8"	PM		S-800D ③	8A21	208S2	② Used in Models 24T070, 24T071.
	10"	PM		ROP-018 ④	10A31	236SI	③ Used in Models 21C110, 21C111, 21C112, 21C113, 21C123, 21C124, 24C180, 24C181.
							④ Used in Models 21C133, 21C134.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC	General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	VHF Ant. Trans.	.3Ω	.3Ω	RLA-043				Tapped
L3	IF Trap	.8Ω		RLI-384				
L3	VHF Ant. Coil	0Ω		RSX-048				Channel 13-Part of complete assembly.
L4	VHF Ant. Coils	0Ω		RSX-048				High channels-complete assembly
L5	VHF Ant.Coils	0Ω		RSX-047				Low channels-complete assembly
L6	VHF Ant. Coil	0Ω		RSX-048				Channel 6-Part of complete assembly.
L7	UHF IF Coil	.1Ω	.1Ω	RTL-181				
L8	Neut. Coil	0Ω		RLI-389				
L9	VHF RF Coil	0Ω		RSX-044				Channel 13-Part of complete assembly.
L10	VHF RF Coils	0Ω		RSX-044				Complete assembly
L11	VHF RF Coil	0Ω		RSX-044				Channel 6-Part of complete assembly
L13	UHF IF Coil	0Ω		RSX-044				Part of complete assembly
L13	Bi-Band Coupling Strap	0Ω						
L14	VHF Mixer Grid Coil	0Ω		RSX-043				Channel 13-Part of complete assembly
L15	VHF Mixer Grid Coils	0Ω		RSX-043				Complete assembly
L16	VHF Mixer Grid Coil	0Ω		RSX-043				Channel 6-Part of complete assembly
L17	UHF IF Coil	0Ω		RSX-043				Part of complete assembly
L18	VHF Osc. Coils	0Ω		RSX-043				Complete assembly
L19	VHF Osc. Coil	0Ω		RSX-043				Channel 13-Part of complete assembly
L20	RF Coil	0Ω						
L21	RF Coil	0Ω		RLI-388				

GENERAL ELECTRIC MODELS 21C110, 111, 112, 113, 123, 124, 211038, 039, 041, 042, 043, 24C180, 181, 241070, 071 ("S" Line)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L22	RF Choke			RLI-085				2.2 Microhenries
L23	Conv. Plate	.1Ω		RLI-285				
L24	1st Video IF	.1Ω		RLI-319	17-4502 *	TV-134 *	6222 *	Includes 47.25MC Trap-Note 1
L25	2nd Video IF	.1Ω	.1Ω	RTL-186	17-4523 *	TV-130 *	6219 *	Note 1
L26	3rd Video IF	.1Ω	.1Ω	RTL-175	17-4524 *	TV-130 *	6219 *	Note 1
L27	4th Video IF	.1Ω	.1Ω	RTL-187	17-4524 *	TV-130 *	6219 *	Note 1
L28	Series Peaking Coil	8.2Ω		RLI-153	19-1005		4612	10 Microhenries, IRC Part #CL-1
L29	Series Peaking Coil	2.3Ω		RLF-024	19-3036	TV-180	6176	31 Microhenries
L30	Shunt Peaking Coil	9.5Ω		RLI-345	19-4400	TV-190	6134	390 Microhenries
L31	Series Peaking Coil	4.2		RLI-207	19-3100	TV-181	6112	100 Microhenries
L32	Series Peaking Coil	.77Ω		RLI-353	19-1001		4604	1.8 Microhenries, IRC Part #CL-1
L33A	4.5MC Trap	3Ω						
B	Sound IF	2.5Ω		RLI-343				Note 1
L34	Shunt Peaking Coil	11Ω		RLI-342	19-3500		6138	470 Microhenries
L35	Series Peaking Coil	10Ω		RLI-328	19-3300 ■	TV-190 ■	6132 ■	330 Microhenries, Wound on 18KΩ resistor
L36A	Ratio Det.	4.8Ω	1.3ΩCT	RTD-021	17-3497	TV-115	6205	Tertiary Winding-.5Ω Note 1
B	Ratio Det.			RTD-023				Note 2
L37	RF Choke	8.2Ω		RLI-153	19-1005		4612	10 Microhenries, IRC Part #CL-1

Note 1. Core Part No. REI-013.
Note 2. Used when 1st Sound IF is 6AU6.
* Drill mounting hole.
■ Parallel with 18KΩ resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L38	40Ω		RLI-344							Core Part No. REI-062

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 ~	REPLACEMENT DATA General Electric PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L39	.220ADC	58Ω	1.2HY	RLF-068	C5040	C2994	C2327	26C41	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA General Electric PART No. FUSE	General Electric PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG P/T S/B	3/8A 250V	REF-011		315.375 (3AG P/T S/B)		MDV 3/8	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA General Electric PART No.	SYLVANIA PART No.	NOTES
M2	1N64GE	RED-001	1N60	Video Det. (Pigtail)

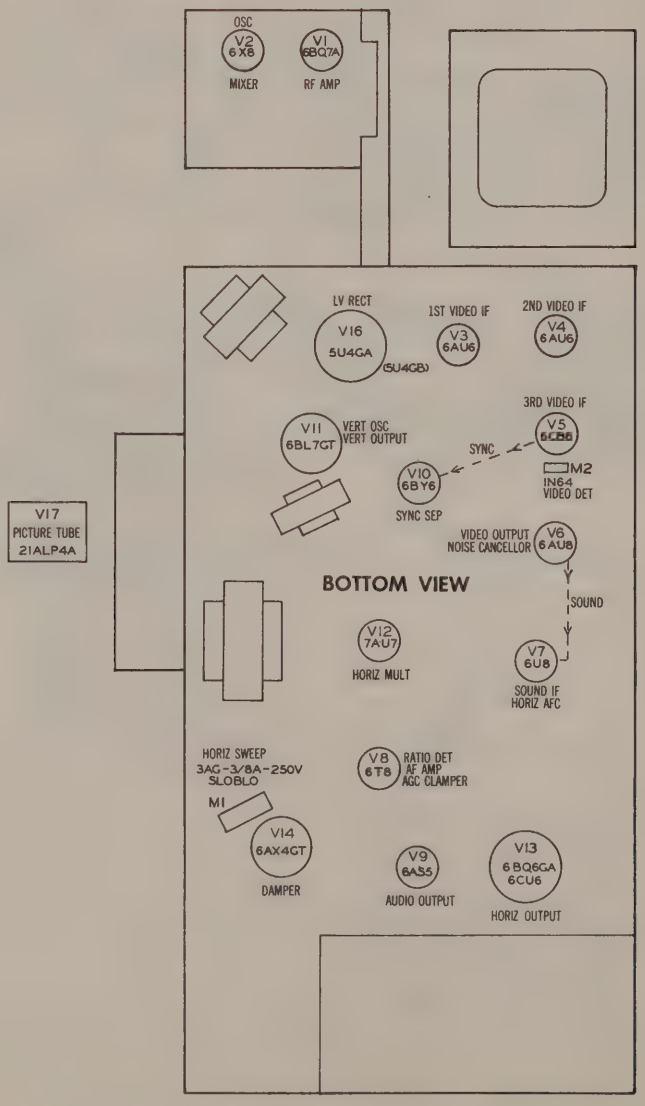
MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M3	Tuner	RJX-080	VHF; VHF Models or VHF-UHFModels
M4	Tuner	RUX-014	UHF; VHF-UHF Models
M5	Switch	RSS-011	Local-distant (DPDT-Slide Type)
M6	Switch	RSS-010	Width-Not used in all versions.
M7	Clock	RZC-059	Model 21C113 only
M8	Centering Device	REA-013	
M9	Ion Trap	RET-013	
	Knob	RDK-467	Brightness-Models 21T039, 21T041, 21T042, 21T043, 21C111, 21C112, 21C113, 21C123, 21C125, 21C124, 24T070, 24T071, 24C180, 24C181, 21C126
	Knob	RDK-473	Brightness-Models 21C110, 21T038
	Knob	RDK-569	Brightness-Model 21T045
	Knob	RDK-469	VHF Channel Selector-Models 21T039, 21T041, 21T042, 21T043, 21C111, 21C112, 21C113, 24T070, 24T071, 24C180, 24C181, 21C125, 21C126
	Knob	RDK-474	VHF Channel Selector-Models 21C110, 21T038
	Knob	RDK-540	VHF Channel Selector-Model 21T045
	Knob	RDK-472	Horizontal Hold-All Models
	Knob	RDK-528	UHF Dial-All models except 21T045.
	Knob	RDK-541	UHF Dial-Model 21T045
	Knob	RDK-531	Volume & Vert. Hold-All models except 21T045
	Knob	RDK-539	Volume & Vert. Hold-Model 21T045
	Knob	RDK-530	Fine Tuning & Contrast - All models
	Knob	RZK-035	Clock, Time Set-Model 21C113
	Knob	RZK-036	Clock (Small Knob)-Model 21C113
	Safety Glass	RDW-101	Models 24T070, 24T071, 24C180, 24C181
	Safety Glass	RDW-102	Model 21C110
	Safety Glass	RDW-103	Models 21T038, 21T045
	Safety Glass	RDW-104	Models 21T039, 21T041, 21T042, 21T043
	Safety Glass	RDW-105	Models 21C111, 21C112
	Safety Glass	RDW-106	Models 21C123, 21C124, 21C125, 21C126
	Safety Glass	RDW-107	Models 21C113

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	† 3. 8KΩ	400KΩ	INF	. 1Ω	0Ω	INF	5Meg	100Ω	0Ω
V 2	6X8	0Ω	4. 7KΩ	■ 6. 8KΩ	. 1Ω	0Ω	0Ω	165KΩ	■ 4. 7KΩ	■ 1. 2KΩ
V 3	6AU6	2. 5Meg	0Ω	. 1Ω	0Ω	† 500Ω	■ 1KΩ	47Ω		
V 4	6AU6	2. 5Meg	0Ω	0Ω	. 1Ω	† 500Ω	■ 1KΩ	56Ω		
V 5	6CB6	. 1Ω	180Ω	0Ω	. 1Ω	† 4. 7KΩ	■ 1KΩ	0Ω		
V 6	6AU8	0Ω	2. 5Meg	† 470KΩ	0Ω	. 1Ω	100Ω	1Meg	100KΩ	† 4KΩ
V 7	6U8	150KΩ	68KΩ	■ 1KΩ	0Ω	. 1Ω	■ 1KΩ	180Ω	800KΩ	1. 3Meg
V 8	6T8	INF	22KΩ	INF	0Ω	. 1Ω	4. 5Meg	0Ω	3. 3Meg	† 400KΩ
V 9	6AS5	100KΩ	300KΩ	0Ω	. 1Ω	300KΩ	† 12KΩ	† 1KΩ		
V 10	6BY6	1. 7Meg	0Ω	0Ω	. 1Ω	† 30KΩ	■ 22KΩ	3Meg		
V 11	6BL7GT	2. 2Meg	▲ 3. 5KΩ	1. 5KΩ	1Meg	▲ 3Meg	150Ω	0Ω	. 1Ω	
V 12	7AU7	† 12KΩ	2. 3Meg	1. 2KΩ	0Ω	. 1Ω	† 82KΩ	36KΩ	1. 2KΩ	1Ω
V 13	6BQ6GA/ 6CU6	TP	. 1Ω	TP	† 12KΩ	1Meg	TP	0Ω	0Ω	TOP CAP ▲ 30Ω
V 14	6AX4GT	TP	NC	200KΩ	NC	† 58Ω	NC	0Ω	. 1Ω	
V 15	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 430Ω
V 16	5U4GA	NC	60KΩ	NC	21Ω	NC	19Ω	NC	60KΩ	
V 17	21ALP4A	0Ω	180KΩ	PIN 6 ▲ 100KΩ	PIN 10 ▲ 100KΩ	PIN 11 ■ 300KΩ	PIN 12 . 1Ω			

† MEASURED FROM PIN 8 OF V16.
■ MEASURED FROM 135V LINE.
▲ MEASURED FROM PIN 3 OF V14.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal output tube (V18) from its socket. Do not remove the horizontal oscillator tube (V18) to disable the high voltage. Allow twenty minutes for warm-up period for receiver and test equipment.

VIDEO IF ALIGNMENT

Set fine tuning control fully counter clockwise.
Connect the negative lead of a 3 volt bias supply to the ungrounded side of C33, the positive lead to chassis.
Set contrast control fully clockwise. If during adjustment two peaks occur, use the one with the slug farthest from the chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to tube shield flooding over 6X8 converter tube. Low side to chassis.	44MC (20MC Swp)	47.25MC	11	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A1	Adjust for MINIMUM amplitude at marker.
2.	"	"	"	42.5MC	"	"	A2	Adjust to place marker at 40 to 50% of curve as in Fig. 1.
3.	"	"	"	45.75MC	"	"	A3	Adjust to place marker at 45% on curve as in Fig. 1.
4.	"	"	"	42.5MC 45.75MC	"	"	A4	Adjust A4 for width of peak region of response curve.
5.	"	"	"	"	"	"	A5, A6	Adjust A5 and A6 for symmetry of curve. Recheck positions of markers and retouch if necessary.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

If a signal generator providing a 4.5MC signal of crystal accuracy is not available, restore the receiver to normal operating condition and tune in a TV station. Connect VTVM and adjust A7, A8 and A9 as in steps 6 and 7.
Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (C) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any unused channel	DC probe to point (B). Common to chassis.	A7, A8	Adjust for maximum deflection.
7.	"	"	"	"	DC probe to point (B). Common to point (C).	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 80% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any unused channel	Vert. Amp. to point (B). Low side to chassis.	A6, A9	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
7.	"	"		"	"	Vert. Amp. to point (B). Low side to chassis.	A10	Reconnect C3. Adjust A10 so that 4.5MC marker occurs at center of crossover lines as in Fig. 5. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

VHF OSCILLATOR ALIGNMENT

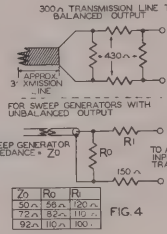
Connect bias as under "Video IF Alignment".
Set the fine tuning control two-thirds from its fully counter clockwise position and leave it in this position during the entire oscillator alignment.
Remove the 300Ω transmission line from the tuner input terminals.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig. 4	Thru coupling network in Fig. 4 across primary of antenna input coil (L1).	213MC (20MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A11	Adjust to place video marker at 45% on response curve as shown in Fig. 5. Sound marker should be between 5 and 7% on response curve.
			207MC (20MC Swp)	205.25MC 209.75MC	12		A13	
			201MC (20MC Swp)	199.25MC 203.75MC	11		A13	
			195MC (20MC Swp)	193.25MC 197.75MC	10		A14	
			189MC (20MC Swp)	187.25MC 191.75MC	9		A15	
			183MC (20MC Swp)	181.25MC 185.75MC	8		A16	
			177MC (20MC Swp)	175.25MC 179.75MC	7		A17	
			85MC (20MC Swp)	83.25MC 87.75MC	6		A18	
			79MC (20MC Swp)	77.25MC 81.75MC	5		A19	
			69MC (20MC Swp)	67.25MC 71.75MC	4		A20	
			63MC (20MC Swp)	61.25MC 65.75MC	3		A21	
			57MC (20MC Swp)	55.25MC 59.75MC	2		A22	

FIG 1

FIG. 2

FIG. 3



Z0	R0	R1
50Ω	56Ω	120Ω
72Ω	82Ω	110Ω
92Ω	110Ω	100Ω

FIG. 4

FIG 5

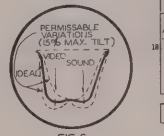


FIG.6

FIG. 7

FIG. 8

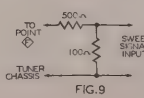


FIG.9

VHF RF AND MIXER ALIGNMENT

Remove the 300Ω transmission line from the tuner input terminals. Connect bias as under "Video IF Alignment".
If L4, L11, or L16 requires adjustment, (normally adjustments is not required) the tuner cover must be removed and replaced before and after each adjustment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Fig. 4	Thru coupling network (Fig. 4) across primary of antenna coil (L1).	213MC (20MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A23, A24	Adjust for response of maximum amplitude and symmetry similar to Fig. 6. If tilt exceeds 15% it may be necessary to compress or expand coil turns of L4. Use insulated tool to prevent shorting Bv.
10.	"	"	177MC (15MC Swp)	175.25MC 179.75MC	7	"	A25, A26 A27	Adjust for response curve similar to Fig. 6. A25 and A26 affect the bandwidth. Adjust A27 for maximum gain and MINIMUM tilt. If necessary, reposition L11 and L16 (coils whose adjustments are A29 and A30) to obtain desired response.
11.	"	"	207MC (15MC Swp)	205.25MC 209.75MC	12	"		Check each channel for response similar to Fig. 6. If not within limits of any high band channel, make compromise adjustments of A25 thru A27 with channel switch set to that channel. Recheck all other high band channels to see that they have not been seriously affected.
			201MC (15MC Swp)	199.25MC 203.75MC	11			
			195MC (15MC Swp)	193.25MC 197.75MC	10			
			189MC (15MC Swp)	187.25MC 191.75MC	9			
			183MC (15MC Swp)	181.25MC 185.75MC	8			
12.	"	"	83MC (15MC Swp)	83.25MC 87.75MC	6	"	A28, A29 A30	Adjust for maximum amplitude and flat-topped response curve similar to Fig. 7.
13.	"	"	79MC (15MC Swp)	77.25MC 81.75MC	5	"	A31, A32, A33	Adjust for response similar to Fig. 7. If necessary, adjust by compressing or expanding coil turns to obtain response similar to Fig. 7.
14.	"	"	69MC (15MC Swp)	67.25MC 71.75MC	4	"	A34, A35, A36	"
15.	"	"	63MC (15MC Swp)	61.25MC 65.75MC	3	"	A37, A38 A39	"
16.	"	"	57MC (15MC Swp)	55.25MC 59.75MC	2	"	A40, A41, A42	"

UHF 40MC ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the tuner AGC line (white wire). Connect the positive lead to tuner chassis.
Switch channel selector to UHF position. Remove shield from L33 and disconnect IF output link from L32.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Fig. 9	High side thru network (Fig. 9) to point (F). Low side to chassis.	630MC (20MC Swp)	40.5MC 45.75MC	UHF position (any)	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A43, A44, A45	Adjust for response similar to Fig 8. Adjust A43 for maximum gain and correct position of 40.5MC marker. Adjust A44 for maximum gain and correct position of 45.75MC marker. Adjust A45 for maximum amplitude and MINIMUM tilt. Replace shield over L33 and reconnect IF link.

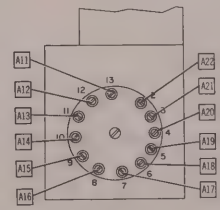
VHF IF TRAP ALIGNMENT

The IF trap (A46) may be aligned by tuning in a station on which the interference occurs and adjusting A46 for minimum interference in picture. Be careful not to adjust A46 so that it attenuates at Channel 2.
If the frequency of the interfering signal is known, the trap may be aligned as in step 18.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
18.	Fig. 4	Thru network in Fig. 4 across VHF antenna terminals.	44MC (10MC Swp)	Set to freq. of interfering signal. Normally adjusted at 43.5MC	2	Vert. Amp. thru 10KΩ to point (A). Low side to chassis		Connect bias as under "UHF 40MC Alignment". Adjust for MINIMUM marker amplitude. Remove bias and all test equipment. Replace V13 in its socket.

UHF TUNER ALIGNMENT

The UHF tuner has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver is not recommended in the field.



GENERAL ELECTRIC MODELS 21C110, 111, 112, 113, 123, 124, 21T038, 039, 040, 042, 043, 24C180, 181, 24T070, 071 ('59 Line)

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal output tube (V13) from its socket. Do not remove the horizontal oscillator tube (V12) to disable the high voltage. Allow twenty minutes for warm-up period for receiver and test equipment.

VIDEO IF ALIGNMENT

Set fine tuning control fully counter clockwise.
Connect the negative lead of a 3 volt bias supply to the ungrounded side of C33, the positive lead to chassis.
Set contrast control fully clockwise. If during adjustment two peaks occur, use the one with the slug farthest from the chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to tube shield floating over 6X8 converter tube. Low side to chassis.	44MC (10MC Swp)	47.25MC	11	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A1	Adjust for MINIMUM amplitude at marker.
2.	"	"	"	42.5MC	"	"	A2	Adjust to place marker at 40 to 55% of curve as in Fig. 1.
3.	"	"	"	45.75MC	"	"	A3	Adjust to place marker at 45% on curve as in Fig. 1.
4.	"	"	"	42.5MC 45.75MC	"	"	A4	Adjust A4 for width of peak region of response curve.
5.	"	"	"	"	"	"	A5, A6	Adjust A5 and A6 for symmetry of curve. Recheck positions of markers and retouch if necessary.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

If a signal generator providing a 4.5MC signal of crystal accuracy is not available, restore the receiver to normal operating condition and tune in a TV station. Connect VTVM and adjust A7, A8 and A9 as in steps 6 and 7.
Connect two matched 100KΩ (±1%) resistors in series from point Ⓑ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod)	Any unused channel	DC probe to point Ⓑ. Common to chassis.	A7, A8	Adjust for maximum deflection.
7.	"	"	"	"	DC probe to point Ⓓ. Common to point Ⓒ.	A9	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.01MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any unused channel	Vert. Amp. to point Ⓑ. Low side to chassis.	A8, A9	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
7.	"	"		"	"	Vert. Amp. to point Ⓓ. Low side to chassis.	A10	Reconnect C3. Adjust A10 so that 4.5MC marker occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

VHF OSCILLATOR ALIGNMENT

Connect bias as under "Video IF Alignment".
Set the fine tuning control two-thirds from its fully counter clockwise position and leave it in this position during the entire oscillator alignment.
Remove the 300Ω transmission line from the tuner input terminals.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig. 4	Thru coupling network in Fig. 4 across primary of antenna input coil (L1).	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A11	Adjust to place video marker at 45% on response curve as shown in Fig. 5. Sound marker should be between 5 and 7% on response curve.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A12	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A13	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A14	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A15	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A16	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A17	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A18	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A19	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A20	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A21	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A22	

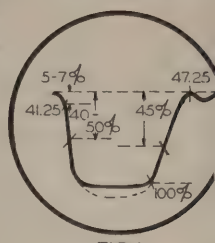
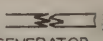


FIG. 1

300Ω T
BAL.

FOR SWEEP GE
UNBALANCED


SWEEP GENERATOR
IMPEDANCE = Zo

Zo	Ro
50Ω	56Ω
72Ω	82Ω
92Ω	110Ω

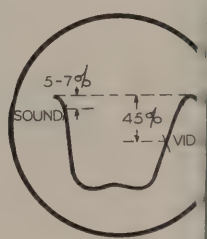


FIG. 5

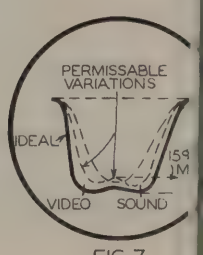
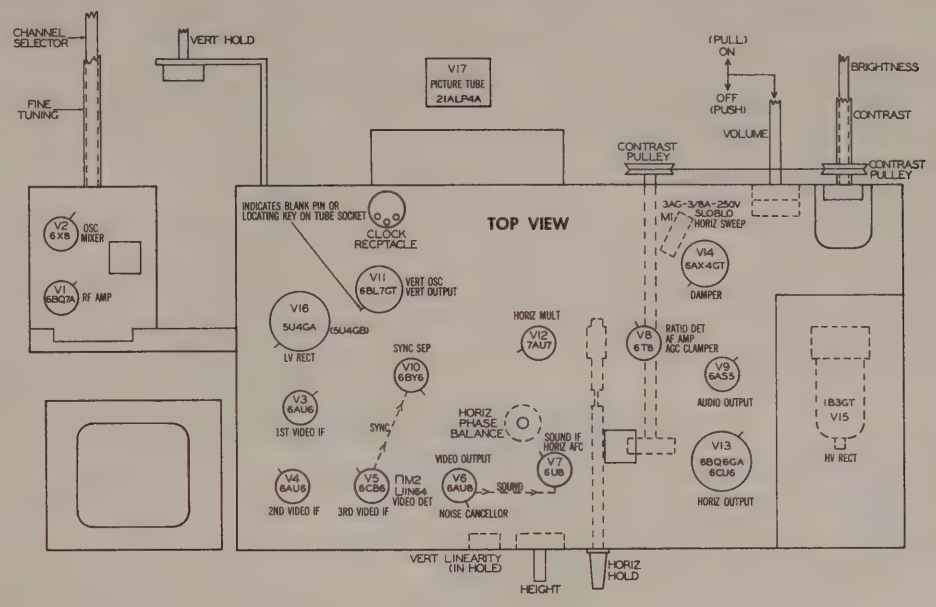


FIG 7

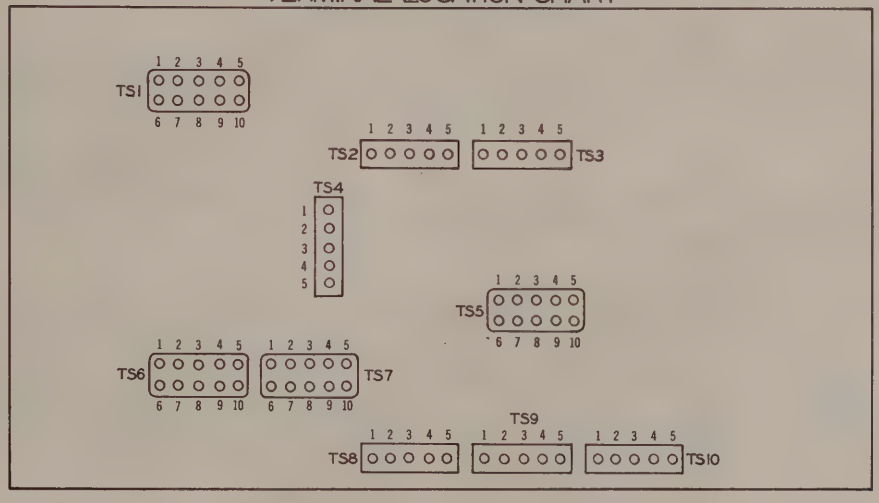
TO
POINT
Ⓕ

TUNER
CHASSIS

TUBE PLACEMENT CHART



TERMINAL LOCATION CHART



TUBE FAILURE CHECK CHART

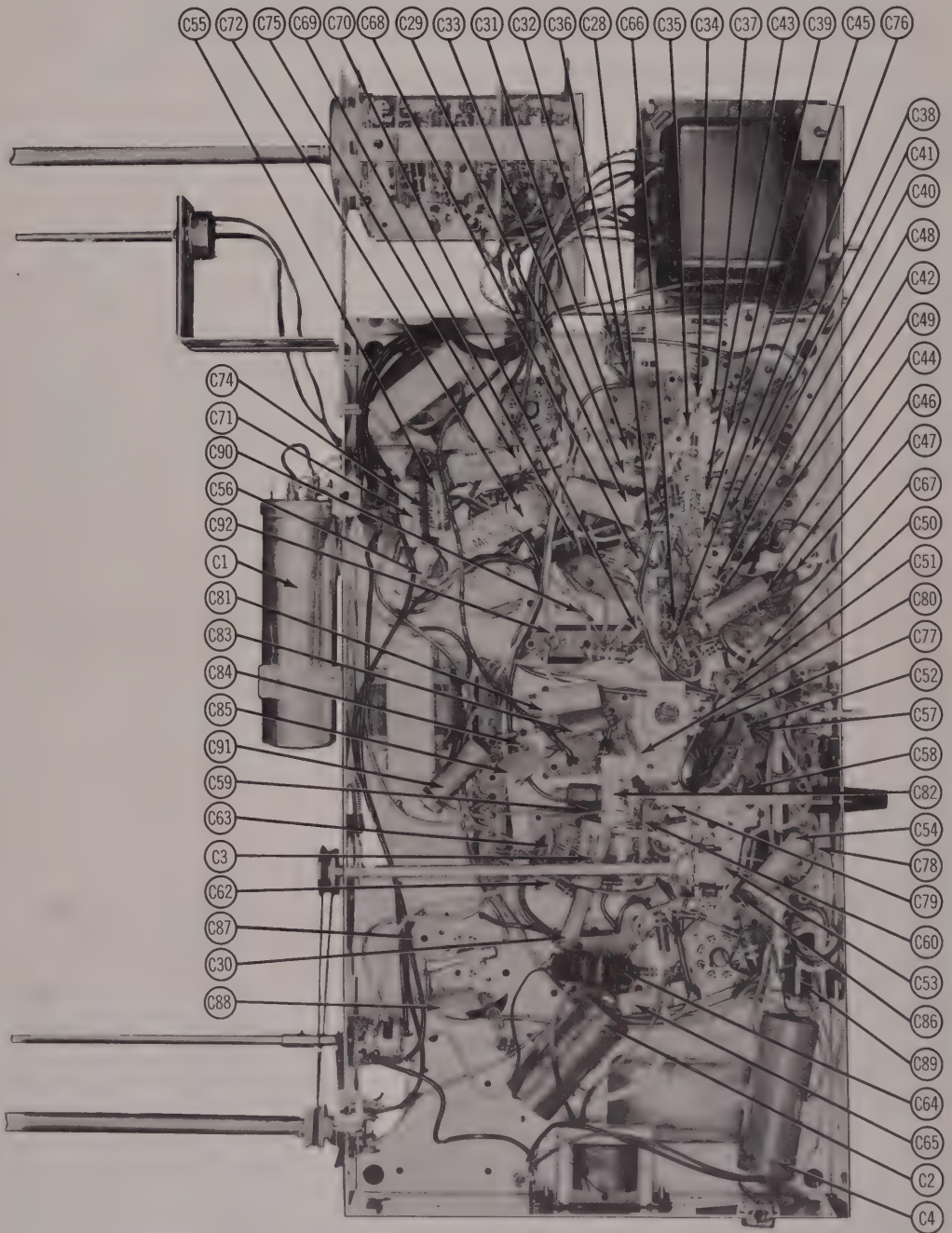
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V16**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V9**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V17**
Has pic, no sound - **V7, V8, V9**
Overloaded picture - **V8**

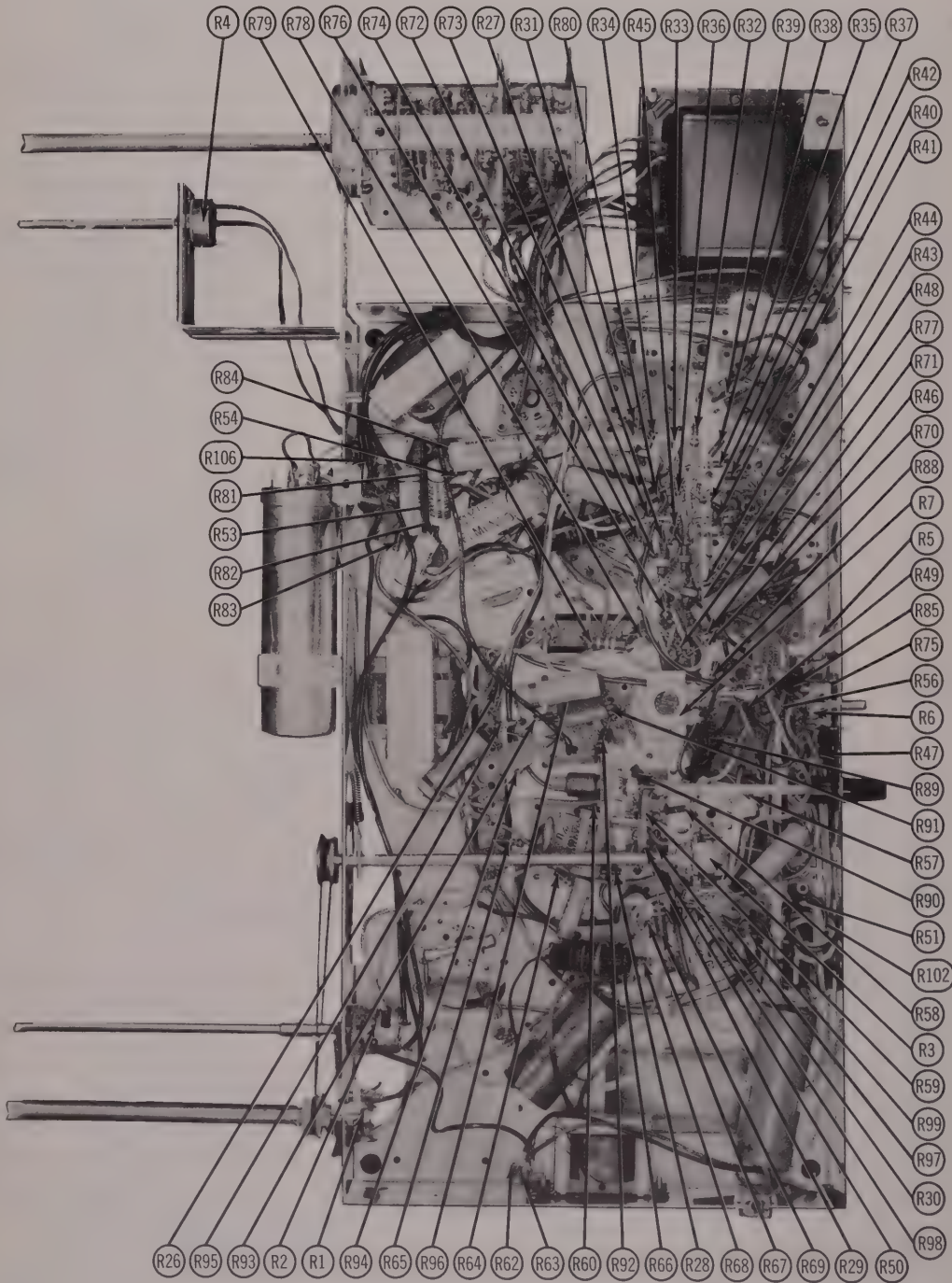
SYNC FAILURE
No vert. sync - **V10, V11**
No horiz. sync - **V7, V10, V12**
No vert. or horiz. sync - **V10**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V17, Fuse (M1)**
No vertical deflection - **V11**
Poor vert. linearity or foldover - **V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V15, V16**
Vert. off freq. - **V10, V11**
Horiz. off freq. - **V7, V10, V12**



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

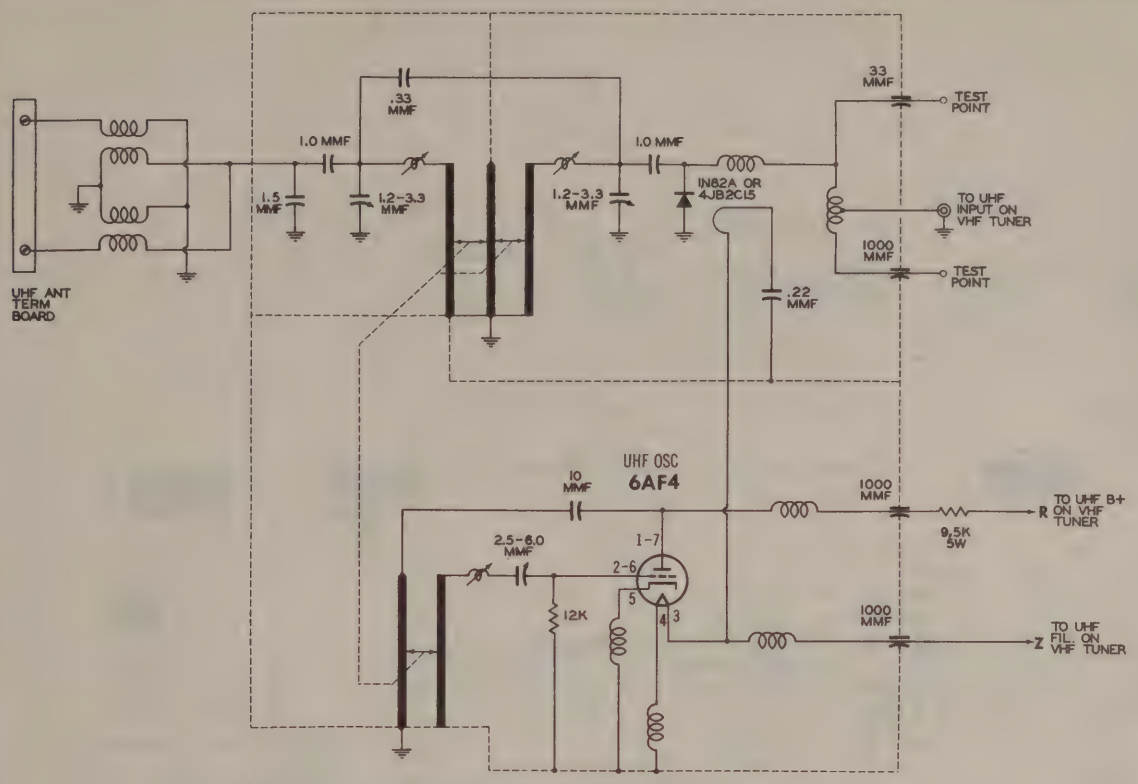
GENERAL ELECTRIC MODELS 21C110, 111, 112, 113,
123, 124, 211038, 039, 041, 042, 043, 24C180,
181, 24C070, 071 ("S" LINE)



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

GENERAL ELECTRIC MODELS 21C110, 111, 112, 113,
123, 124, 21T038, 039, 041, 042, 043, 24C180,
181, 24T070, 071 ("S" Line)

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



UHF TUNER PART NO. RUX-014 USED WITH UHF MODELS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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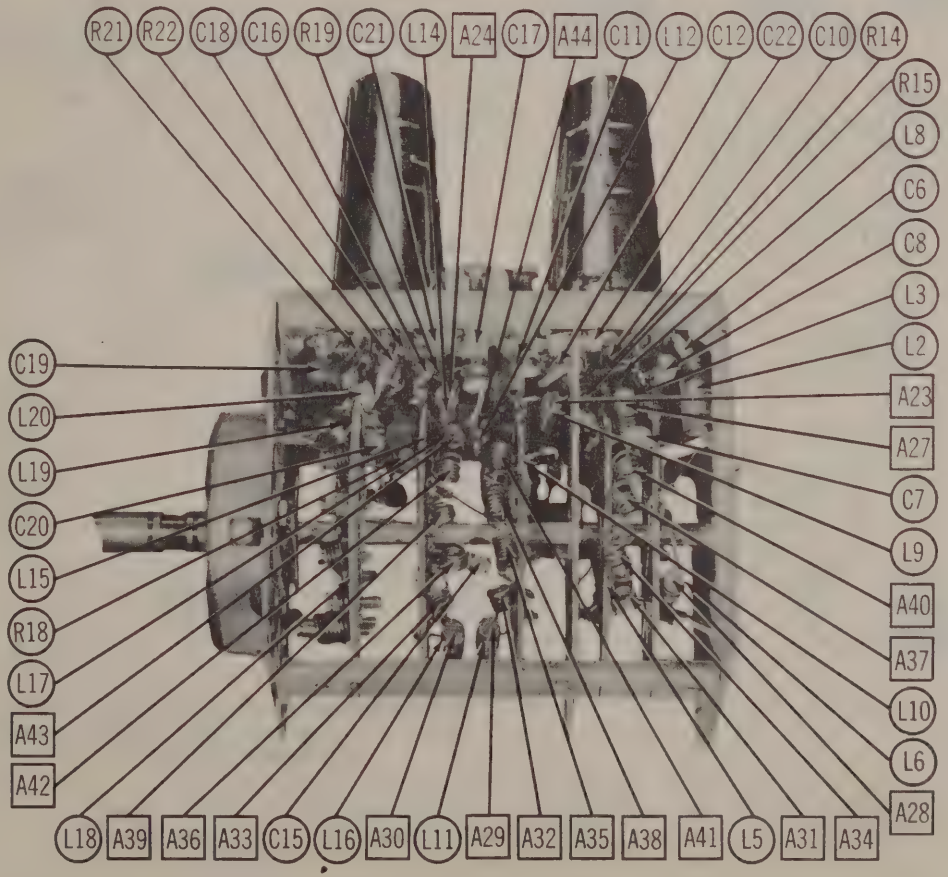
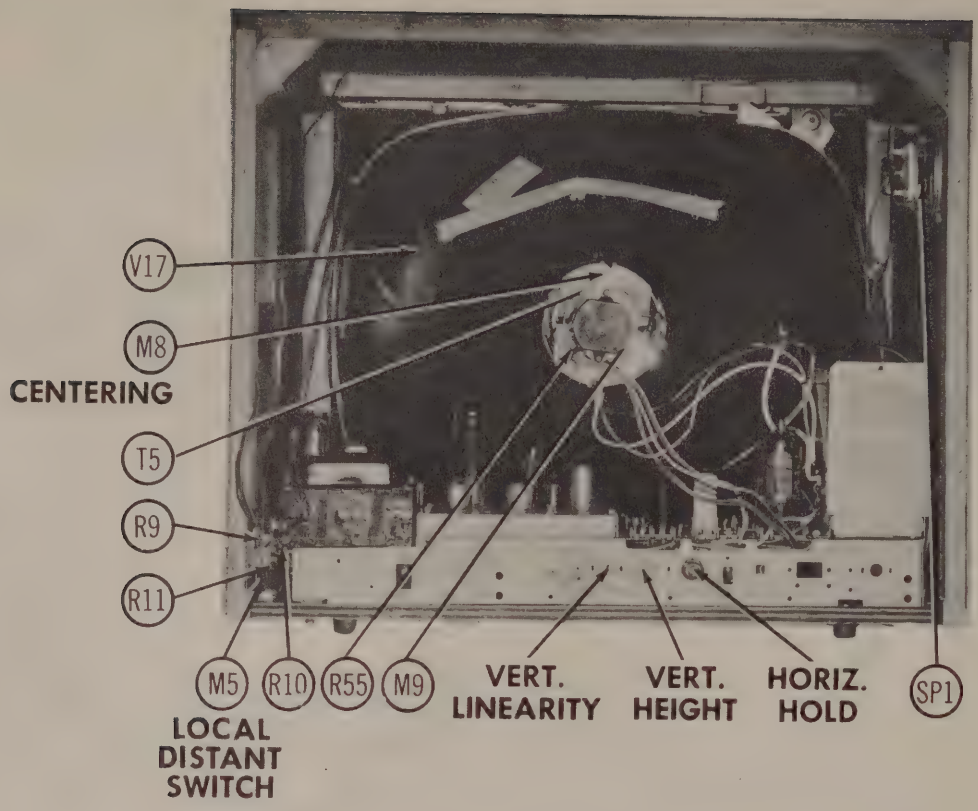
UHF TUNER SCHEMATIC



RF TUNER-RIGHT SIDE



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Adjustment of the phase balance should be necessary only if a tube in the horizontal sweep circuit is replaced. Use a very weak signal when making this adjustment.

1. Turn the horizontal hold counter clockwise until the picture is out of sync by eight bars. Connect a VTVM from test point 5 to ground. Using the lowest DC scale, set the phase balance at the point where the voltage reading will be -.5 volts. (Maintain eight bars throughout this adjustment by manipulating the horizontal hold (L38).

2. Turn horizontal hold (L38) clockwise until picture just pulls in and then continue rotating knob 45 degrees farther clockwise. Increase the signal to normal level and check lock-in stability.

FOR SETS HAVING SELENIUM PHASE DETECTOR BUT NO HORIZONTAL HOLD POTENTIOMETER

Tune in a weak station and adjust the horizontal hold slug (L38) until the picture synchronizes horizontally. Switch on and off channel and set L38 for best pull-in action. Check on normal strength signal.

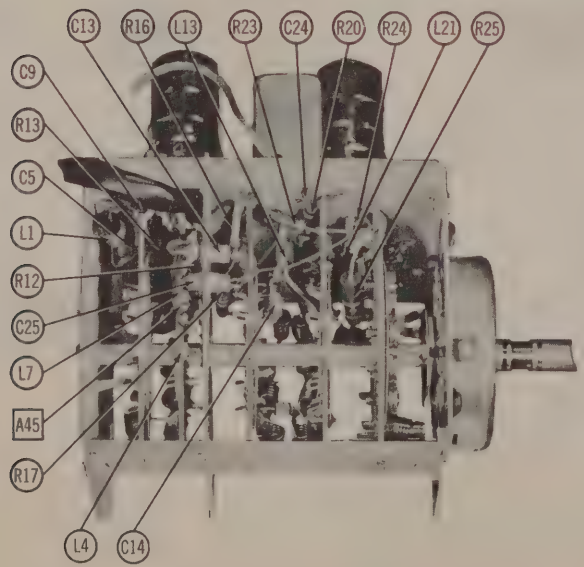
FOR SETS HAVING SELENIUM PHASE DETECTOR AND HORIZONTAL HOLD POTENTIOMETER

1. Short junction of C79 and R90 to chassis with a clip lead. Shunt horizontal stabilizer coil L38 with a 1KΩ resistor.

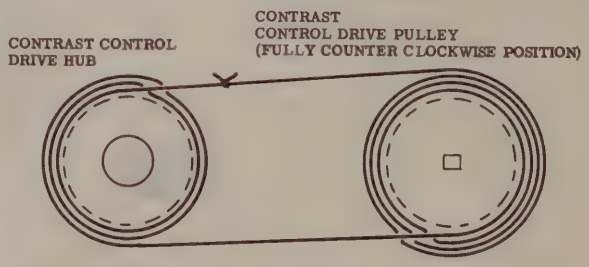
2. Adjust horizontal hold control (R8) so that picture floats back and forth through synced position.

3. Remove 1KΩ shunt from across L38. Adjust L38 so that picture again floats back and forth as in step 2.

4. Remove short from junction of C79 and R90 to chassis. Check horizontal pull-in on normal signal and readjust horizontal hold control (R8) if necessary.

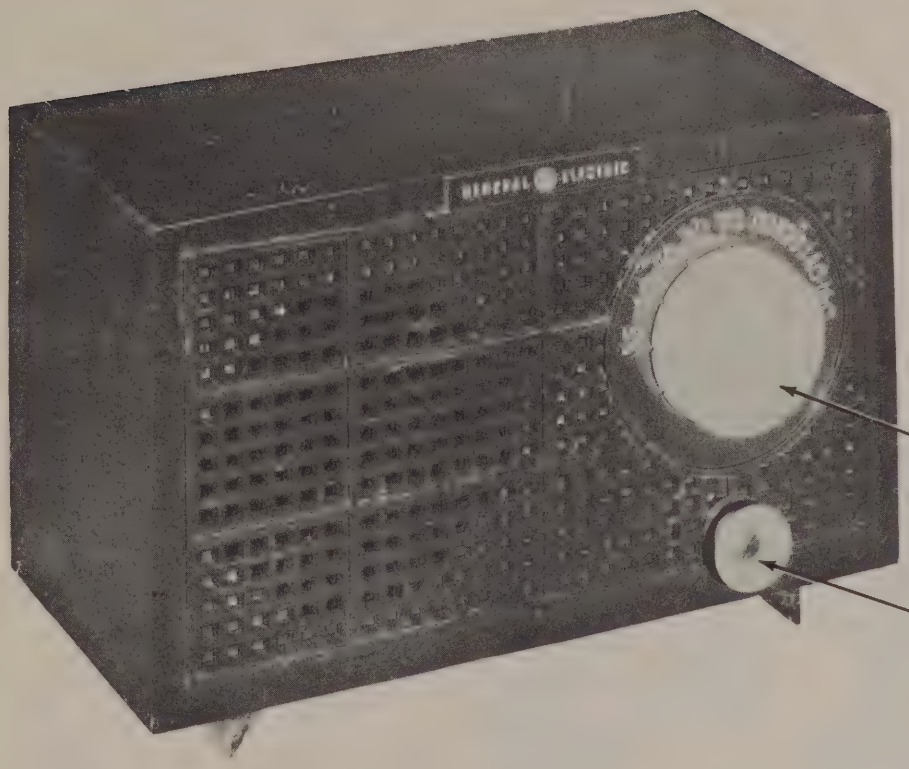


RF TUNER LEFT SIDE



DRIVE CORD STRINGING

GENERAL ELECTRIC
MODEL 453



GENERAL ELECTRIC
MODEL 453

TRADE NAME	General Electric Model 453
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Four)	Types 12AU6 Converter, 12AV6 Det.-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-DC
RATING	.23 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (grid) of 12AU6 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open.	Across Voice Coil	A1	With 10K resistor across primary (A2), adjust A1 for maximum output.
2.	"	"	"	"	"	A2	With 10K resistor across secondary (A2), adjust A1 for maximum output.
3.		Loop	1620KC	"	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	1500KC	Tune to 1500KC signal	"	A4	Adjust for maximum output while rocking tuning gang.

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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

GENERAL ELECTRIC
Model 453

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		General Electric PART No.	STANDARD REPLACEMENT	
V1	Converter	12AU6	12AU6	
V2	Det. -AF Amp.	12AV6	12AV6	
V3	Output	50C5	50C5	
V4	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	General Electric PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	RCE-216					CATP-526.5	
B	20	150							
C	5	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	68		UCG-1024	NPO-S168	TCZ-68	TZ26	NPO-338-680		5TCC-Q68	
C3	1.5		RCN-048	NPO-S11R5	TCZ-1R5	TZ04	NPOA-1R5	ZT-5515	5TCCB-V15	
C4	100		RCW-3079		TCL-100					
C5A	3500		RCW-3036							
B	220									
C	5000									
C6	10000		RCW-3186	BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C7	.047	600	RCN-053	BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	General Electric PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2Meg	½	RRC-334	AB-76	A47-2Meg-Z	Q13-139	U-55	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	General Electric PART No.	IRC PART No.	
R2	2.2Meg	½	URD-129	BTS-2.2Meg	
R3	6.8Meg	½	URD-141	BTS-6.8Meg	
R4	470KΩ	½	URD-113	BTS-470KΩ	
R5	470KΩ	½	URD-113	BTS-470KΩ	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	General Electric PART No.	IRC PART No.	
R6	5600Ω	½	URD-031	BTS-5600	
R7	180Ω	2	URD-067	BTS-180	
R8	33Ω	2	URF-013		

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	General Electric PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.7KΩ	3.4Ω	RTO-176				26S58 ①		① Use original channel

SPEAKER

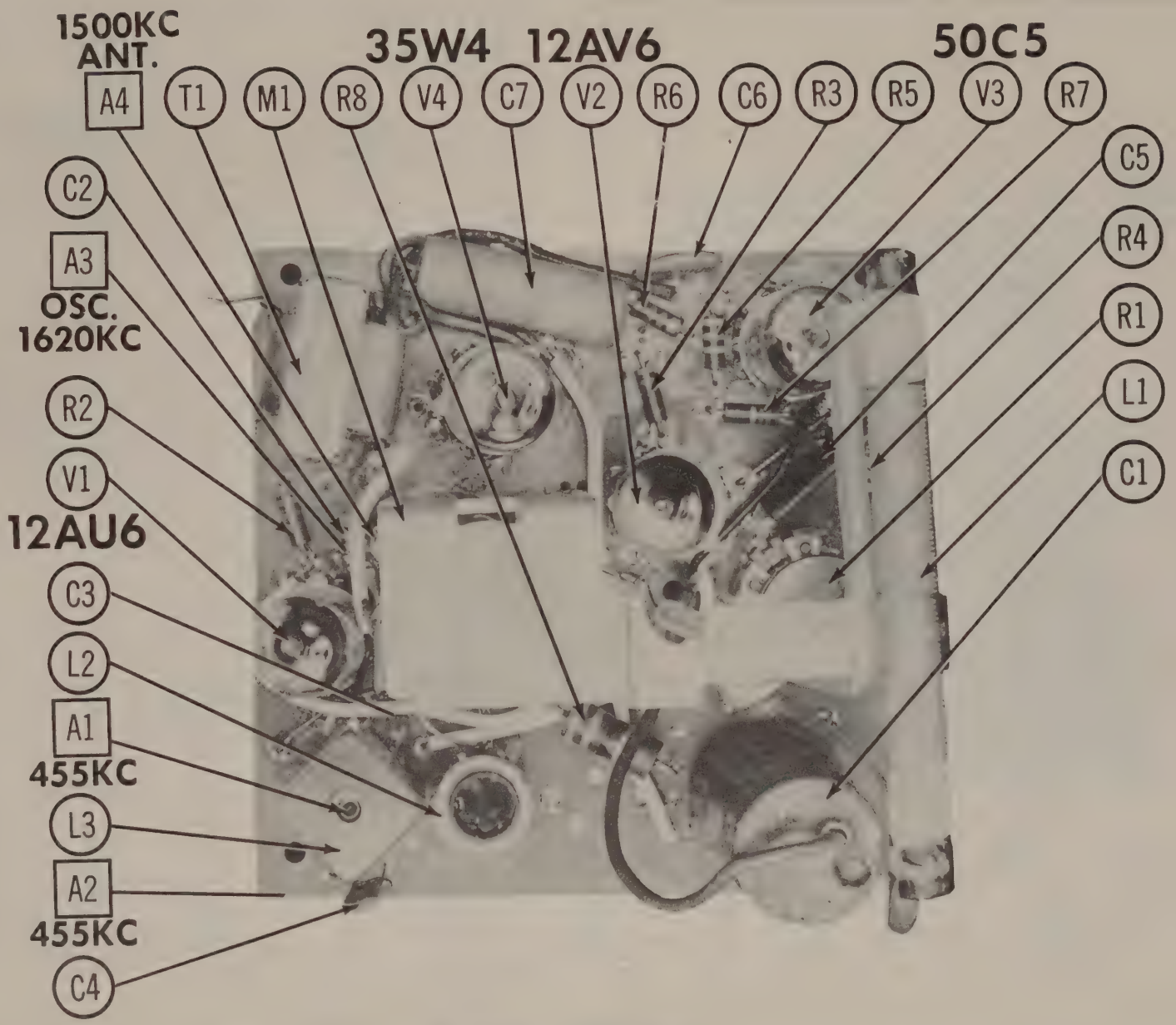
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	General Electric PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3.4Ω	S440H	4A07	223S1	

COILS (RF-IF)

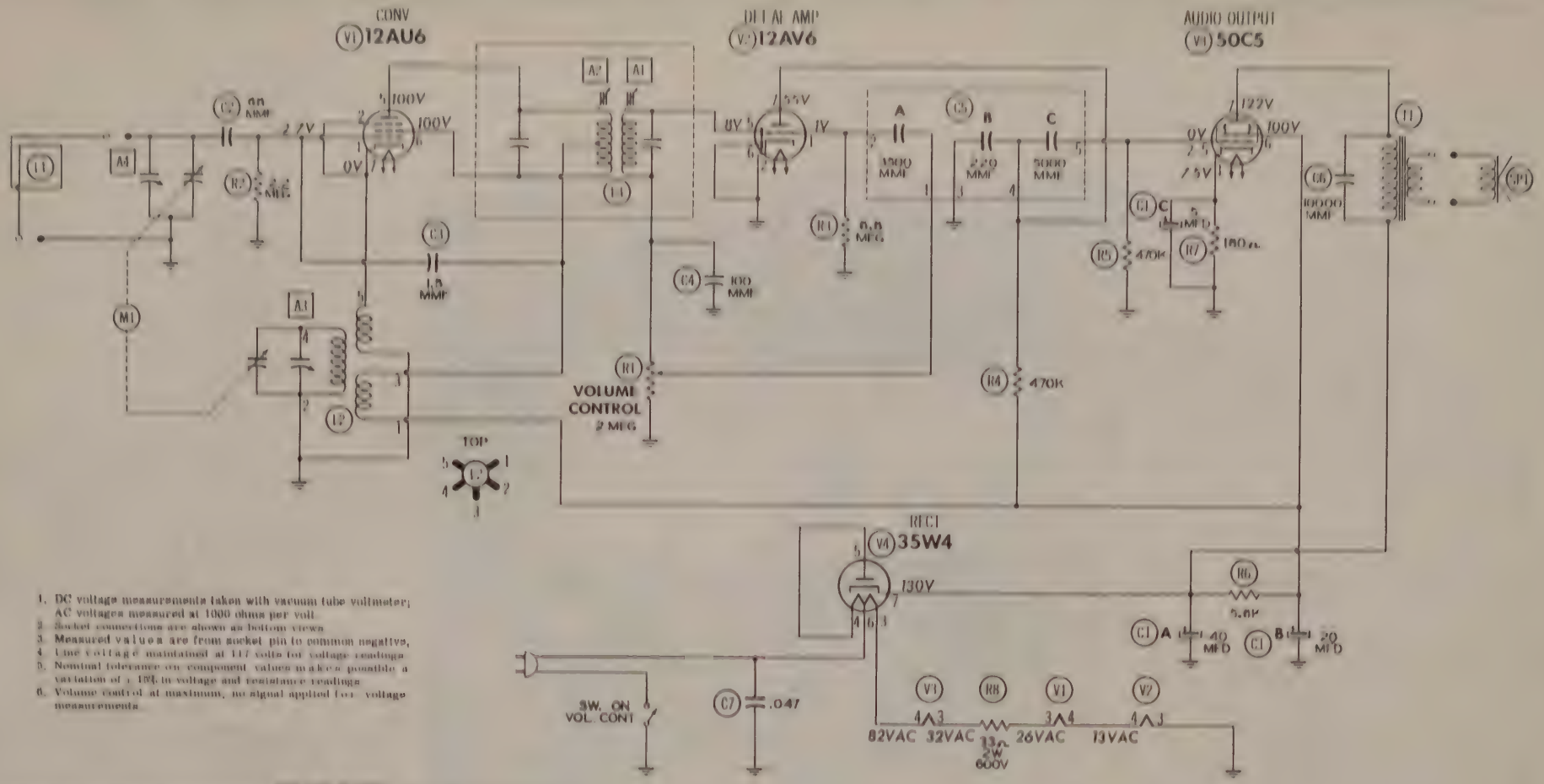
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.3Ω		RLL-064				
L2	Osc. Coil	1.5Ω	8Ω	RLC-136				Tertiary Winding=2.2Ω
L3	IF Trans.	40Ω *	41Ω	RTL-184				*Tapped ② .9Ω

MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M1	Tuning Cap.	RCT-093	2 Gang (15-290MMF, 19-125MMF)
	Cabinet	RAU-450	
	Knob	RDK-295	On-off-volume
	Knob	RDK-514	Tuning



CHASSIS TOP VIEW



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12AU6	2.2Meg	1.5Ω	24Ω	13Ω	† 5.6KΩ	† 5.6KΩ	1.5Ω
V 2	12AV6	6.8Meg	0Ω	0Ω	13Ω	2Meg	0Ω	† 470KΩ
V 3	50C5	180Ω	470KΩ	57Ω	107Ω	470KΩ	† 5.6KΩ	† 250Ω
V 4	35W4	NC	TP	107Ω	143Ω	142Ω	137Ω	100KΩ

† MEASURED FROM PIN 7 OF V4.
TP-TIE POINT.
NC-NO CONNECTION.

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MASCO
MODEL WFP

MASCO
MODEL WFP

TRADE NAME	Masco Model WFP
MANUFACTURER	Mark Simpson Mfg., Co., Inc., 32-28 49th. St., Long Island City 3, N.Y.
TYPE SET	AC-DC Operated Wireless Intercommunications Station
TUBES (Four)	Types 35C5 Detector-RF Osc., 12AX7 AF Amplifier-Squelch Control, 50C5 Output-Modulator, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC RATING .23 Amp. @ 117 Volts AC

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	ZERO BEAT INDICATOR	ADJUST	REMARKS
1.	.05MFD	High side to antenna lead. Low side to chassis.	Any freq. from 200 KC to 250 KC (Unmod)	With all equipment on, place unit in "Dictate" position.	High side to antenna. Low side to chassis.	A1	Adjust for zero beat.

FREQUENCY ADJUSTMENT

Units are preset for 200KC operation at the factory. Alignment is required only if the oscillator coil is replaced, or if operation of two or more systems side by side is desired. Frequencies of 200KC, 225KC or 250KC are recommended when using two or more systems side by side to prevent interference.

EQUIPMENT REQUIRED

A. Signal generator with ½ volt or more output, tunable to 150-300KC.
B. A 20,000 ohm per volt meter or VTVM.
C. Germanium diode and high impedance headphones, or germanium diode and oscilloscope, or diode probe and oscilloscope or VTVM.

PROPERTY OF
L. I. ELECTRONICS
700 READE ST.
DENVER, COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

MASCO
Model WFP

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		MASCO PART No.	STANDARD REPLACEMENT	
V1	Detector-RF Oscillator	35C5	35C5	
V2	AF Amplifier-AF Amplifier	12AX7	12AX7	
V3	Output-Modulator	50C5	50C5	
V4	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MASCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■40	150		AFH3-10	C009	FP311.5	TM-403020-150	T-040	TVL-3440
B	▲40	150							
C	20	150		PRS50V10	BR105	TC32	TD-10-50	FM-0510	TVA-1304
C2	10	50							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MASCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C4	120			BPD-00012	DD-121	G044	811-121	UC-5312	5GA-T12	
C5	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C6	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C7	150	500		SI150	D6-151	TP36	GP2K-151	MC236	1FM-315	
C8	470			SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C9	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C10	220			BPD-00022	DD-221	G051	811-221	UC-5322	5GA-T22	
C11	.03	200		BPD-03	DF-303	CUB6S3		PT613	4TM-S3	
C12	820	500		SI820	D6-821	5W5T82	GP2L-821		1FM-382	Note 1
C13	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C14	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C15	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

Note 1. Some versions use 1000MMF in this application.

CONTROLS

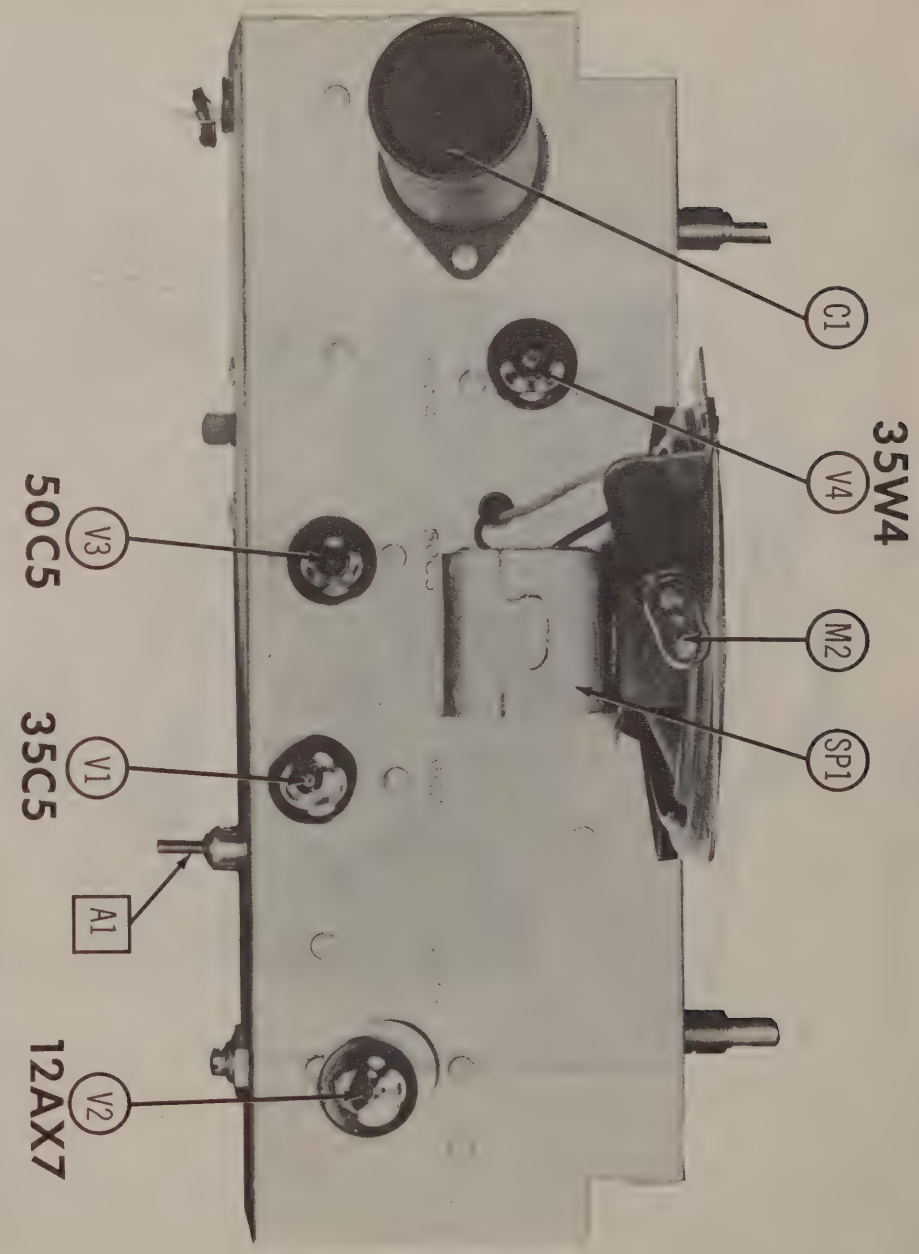
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MASCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½		AB-60				Volume & switch
B	Shaft			AK-3				Attach to R1A
C	Bushing			AK-26				Attach to R1A
D	Switch			KB-1				Attach to R1A
R2A	500KΩ	½		AB-60	A47-500K-Z	Q13-133	U-48	Squelch
B	Shaft			AK-1	FKS-1/4	RQ	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MASCO PART No.	IRC PART No.	
R3	47KΩ	½		BTS-47K	
R4	100KΩ	½		BTS-100K	
R5	5.6Meg	½		BTS-5.6Meg	
R6	4700Ω	½		BTS-4700	
R7	47KΩ	½		BTS-47K	
R8	27KΩ	½		BTS-27K	
R9	270KΩ	½		BTS-270K	
R10	1000Ω	½		BTS-1000	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MASCO PART No.	IRC PART No.	
R11	1Meg	½		BTS-1Meg	
R12	270KΩ	½		BTS-270K	
R13	10KΩ	½		BTS-10K	
R14	39KΩ	½		BTS-39K	
R15	470KΩ	½		BTS-470K	
R16	150Ω	½		BTS-150	
R17	82Ω	1			
R18	150Ω	1		BTA-150	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MASCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.3KΩ	16.7Ω	13-0-2C	Z1001	A-2902 ①	A-3849①	24S60	S-53X ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MASCO PART No.	QUAM PART No.	RCA TYPE No.	
SP1	3½"	PM	16.7Ω	1454	3A07Z16.7		

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC. 1	MASCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Osc. Coil	.3Ω	17Ω SEC. 2 53Ω	WF-2				

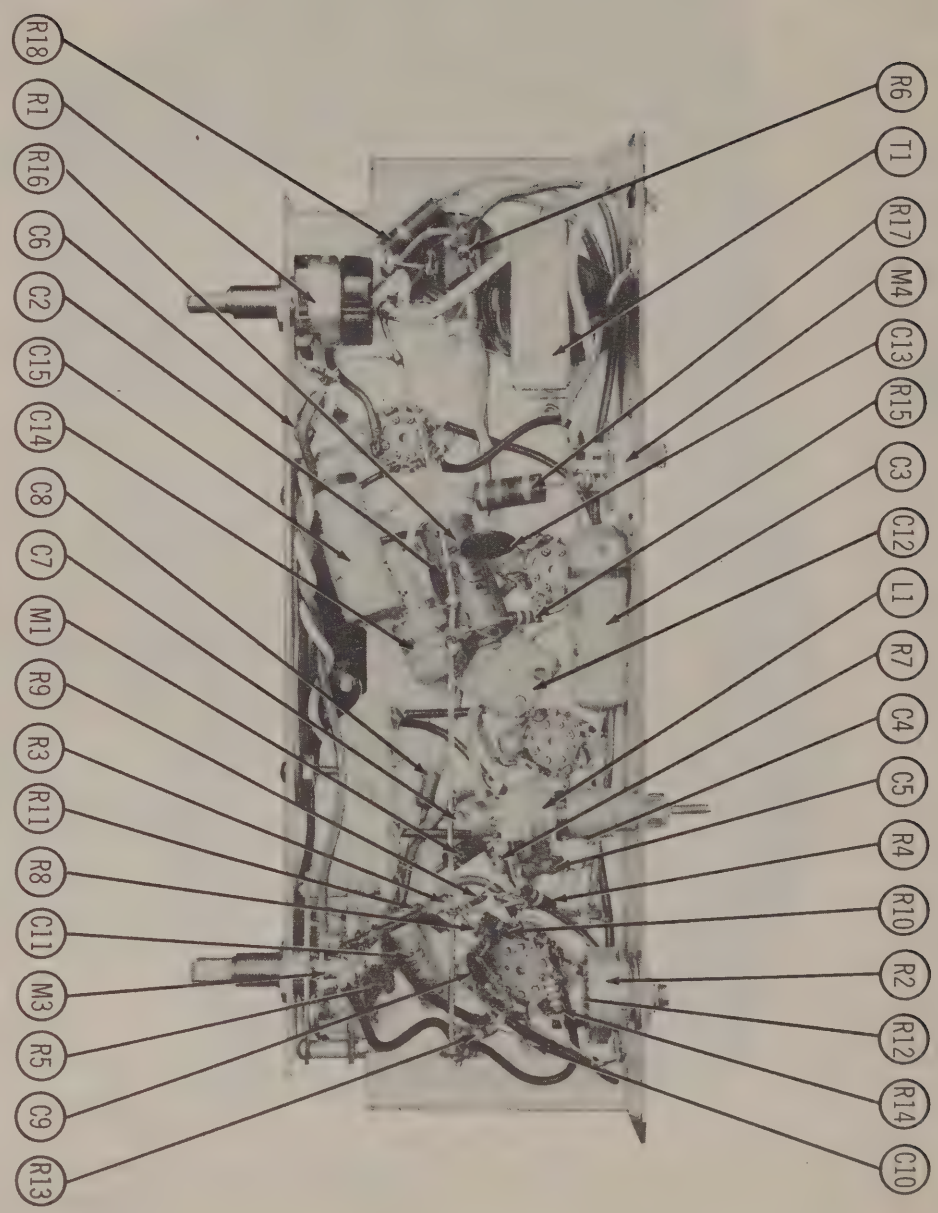
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		MASCO PART No.	SYLVANIA PART No.	
M1	1N51		1N34A	Audio Detector

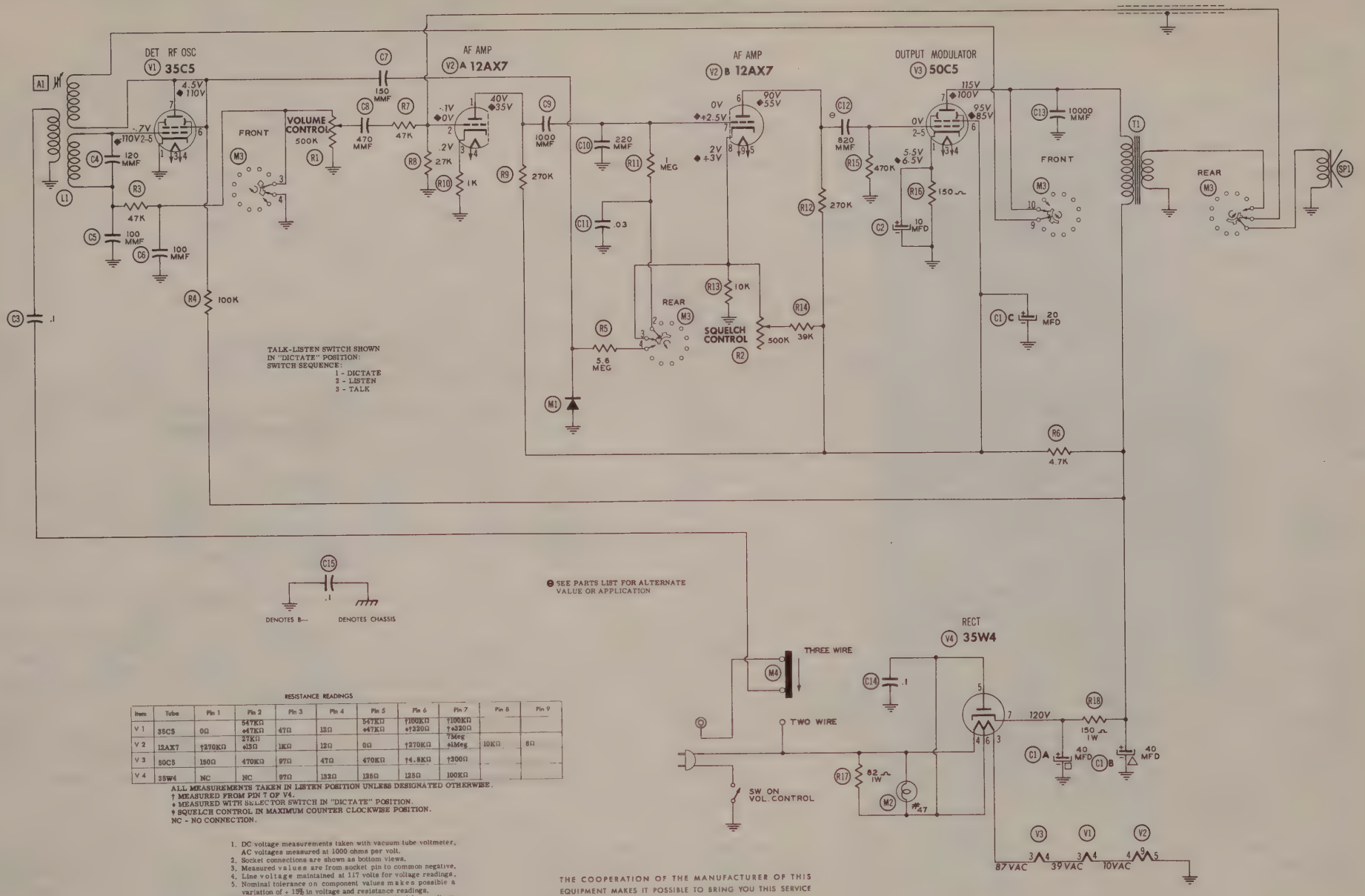
MISCELLANEOUS

ITEM No.	PART NAME	MASCO PART No.	NOTES
M2	Pilot Light		#47
M3	Switch	1081B	Talk-listen-dictate (Rotary-wafer type)
M4	Switch		Two wire - three wire (SPDT-Slide type)

CHASSIS—BOTTOM VIEW



MASCO Model WFP



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	35C5	0Ω	547KΩ ◆47KΩ	47Ω	13Ω	547KΩ ◆47KΩ	†100KΩ ◆†320Ω	†100KΩ †◆320Ω		
V 2	12AX7	†270KΩ	27KΩ ◆25Ω	1KΩ	12Ω	0Ω	†270KΩ	7Meg ◆1Meg	10KΩ	8Ω
V 3	50C5	150Ω	470KΩ	97Ω	47Ω	470KΩ	†4.8KΩ	†300Ω		
V 4	35W4	NC	NC	97Ω	132Ω	126Ω	125Ω	100KΩ		

ALL MEASUREMENTS TAKEN IN LISTEN POSITION UNLESS DESIGNATED OTHERWISE.
† MEASURED FROM PIN 7 OF V4.
◆ MEASURED WITH SELECTOR SWITCH IN "DICTATE" POSITION.
♦ SQUELCH CONTROL IN MAXIMUM COUNTER CLOCKWISE POSITION.
NC - NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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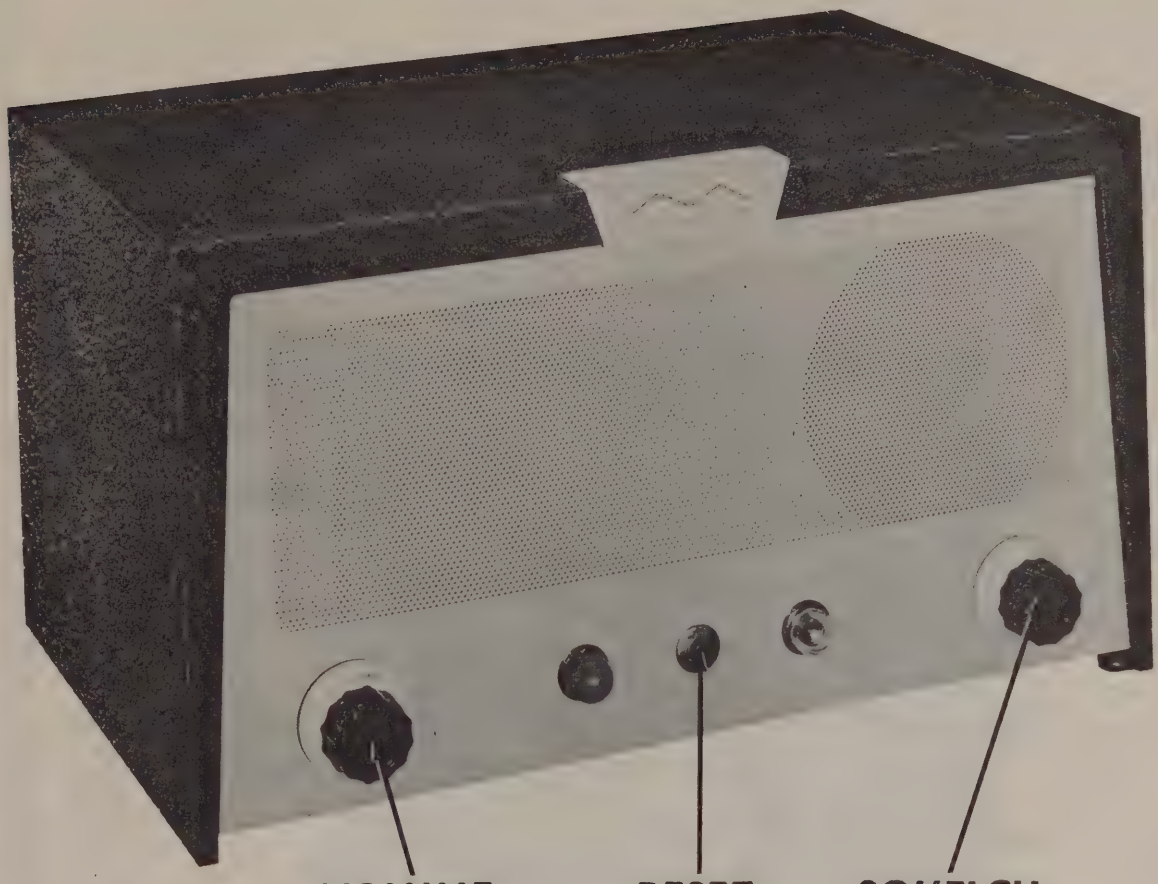
MONITORADIO
MODEL MCA-100-H

MONITORADIO
MODEL MCA-100-H



MONITORADIO
MODEL MCA-100-H

TRADE NAME	Monitoradio Model MCA-100H
MANUFACTURER	Radio Apparatus Corp., 7900 Pendleton Pike, Indianapolis, Ind.
TYPE SET	AC Operated FM Double Conversion Superheterodyne Receiver
TUBES	Twelve
POWER SUPPLY	105-125 Volts AC-60 Cycles RATING .65 Amp. @ 117 Volts AC
TUNING RANGE	FREQ. MOD. 147MC-174MC

PROPERTY OF
L. F. HAWKENSHIP.
3[illegible] GRANDE ST.
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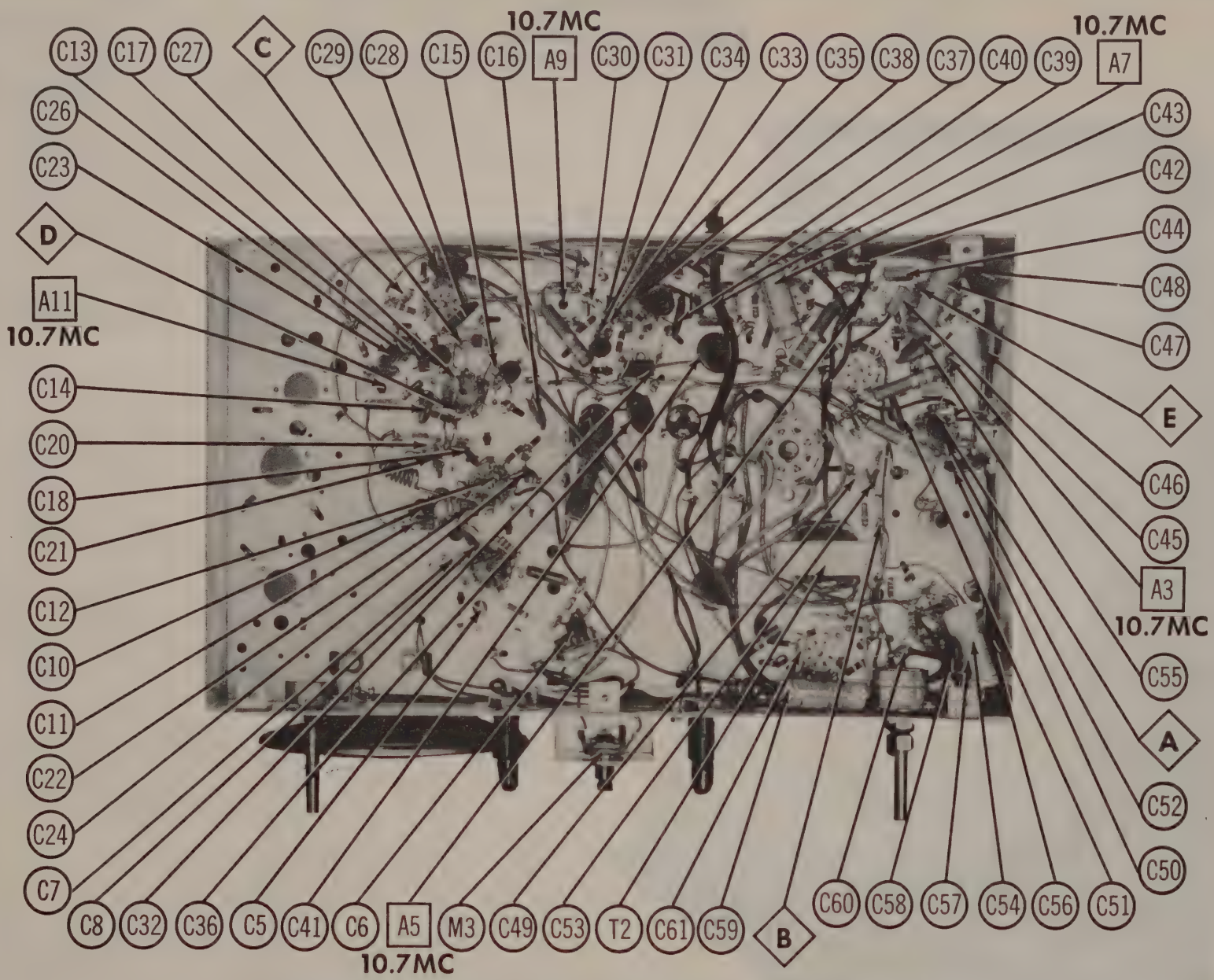
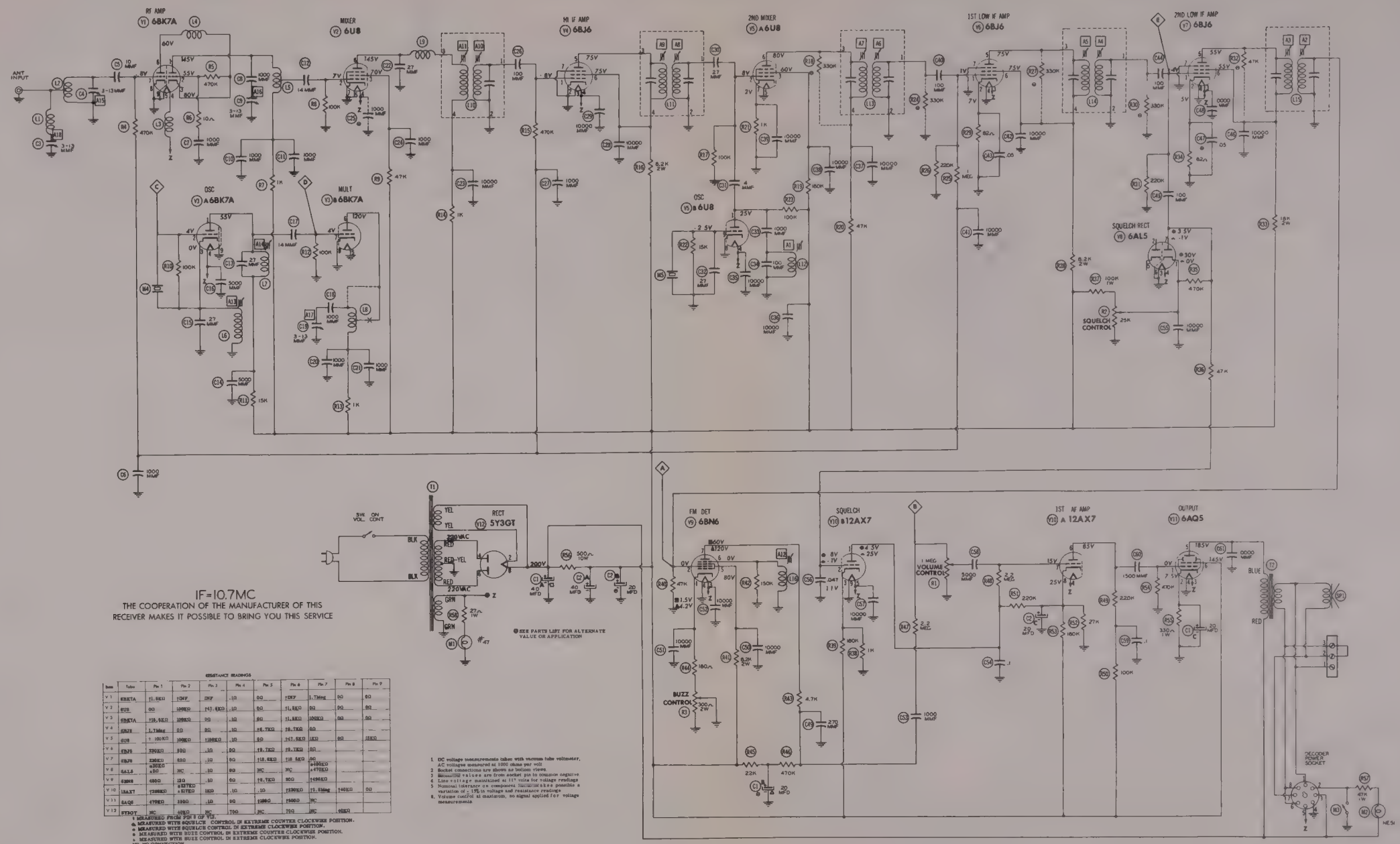


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7A	11.8KΩ	†ONF	ONF	.1Ω	0Ω	†ONF	1.7Meg	0Ω	0Ω
V 2	6U8	0Ω	100KΩ	147.4KΩ	.1Ω	0Ω	11.8KΩ	0Ω	0Ω	0Ω
V 3	6BK7A	†18.6KΩ	100KΩ	0Ω	.1Ω	0Ω	11.8KΩ	100KΩ	0Ω	0Ω
V 4	6BJ8	1.7Meg	0Ω	0Ω	.1Ω	18.7KΩ	18.7KΩ	0Ω		
V 5	6U8	† 100KΩ	100KΩ	†180KΩ	.1Ω	0Ω	147.5KΩ	0KΩ	0Ω	0KΩ
V 6	6BJ6	520KΩ	0Ω	.1Ω	0Ω	18.7KΩ	18.7KΩ	0Ω		
V 7	6BJ6	230KΩ	0Ω	.1Ω	0Ω	†18.6KΩ	18.6KΩ	0Ω		
V 8	6AL5	a300KΩ a0Ω	NC	.1Ω	0Ω	NC	NC	a470KΩ a470KΩ		
V 9	6BN6	680Ω	12Ω	.1Ω	0Ω	18.7KΩ	80Ω	†496KΩ		
V 10	12AX7	†288KΩ	a837KΩ a837KΩ	180Ω	.1Ω	.1Ω	†230KΩ	11.8Meg	†40KΩ	0Ω
V 11	6AQ5	470KΩ	330Ω	.1Ω	0Ω	†288Ω	†500Ω	NC		
V 12	5Y3GT	NC	45KΩ	0Ω	†0Ω	NC	†0Ω	NC	45KΩ	

† MEASURED FROM PIN 8 OF V12.
a MEASURED WITH SQUELCH CONTROL IN EXTREME COUNTER CLOCKWISE POSITION.
b MEASURED WITH SQUELCH CONTROL IN EXTREME CLOCKWISE POSITION.
c MEASURED WITH BUZZ CONTROL IN EXTREME COUNTER CLOCKWISE POSITION.
e MEASURED WITH BUZZ CONTROL IN EXTREME CLOCKWISE POSITION.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. AC voltages measured at 1000 ohms per volt
3. Socket connections are shown as bottom views.
4. [illegible] values are from socket pin to common negative
5. Line voltage maintained at 117 volts for voltage readings
6. Nominal tolerance on components [illegible] shows possible a variation of ± 15% in voltage and resistance readings
8. Volume control at maximum, no signal applied for voltage measurements

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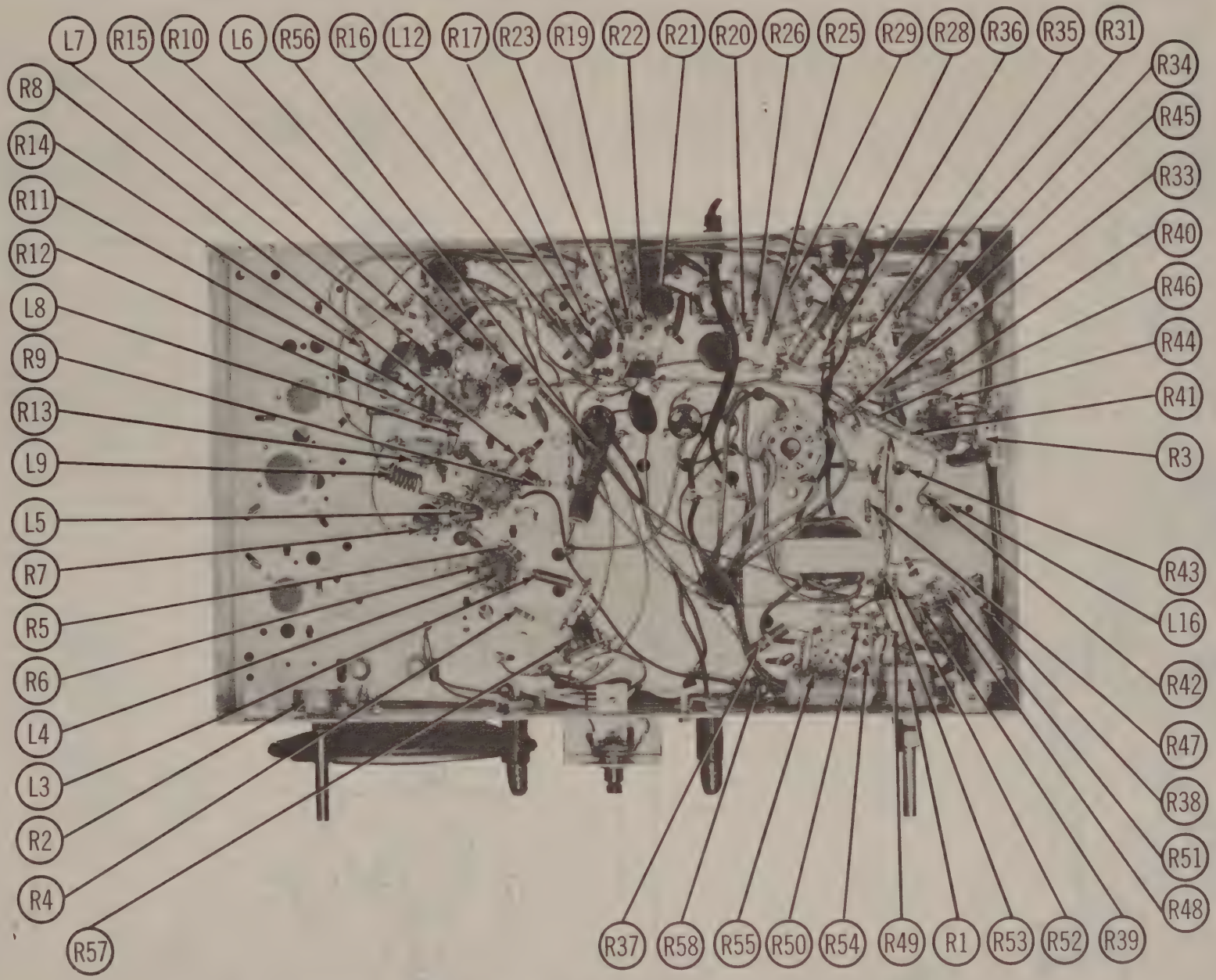


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Do not align unless it is definitely known that IF alignment has been tampered with.
Proper crystal must be used.
Set output of generator no higher than necessary to obtain readable signal.

SECOND OSCILLATOR ALIGNMENT USING VTVM

DC probe to pin 9 of 6U8 (V5). Common to chassis.
Adjust L12 slug (A1) for maximum deflection.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Connect synchronized sweep voltage from generator to horizontal input of scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 2 (grid) of 6U8 (V2). Low side to chassis.	10.7MC (80KC Swp)	Not used	Not used	Vert. Amp. thru detector (Fig. 1) to point Ⓐ. Low side to chassis.	A2, A3, A4, A5, A6, A7	Set marker to 10.7MC. Adjust for maximum amplitude and symmetry similar to Fig. 2. When adjusting secondary coil, shunt primary coil with 1KΩ resistor. When adjusting primary coil, shunt secondary coil. Attenuate generator to prevent distortion of response curve.
2.	"	"	"	"	"	"	A8, A9, A10, A11	DO NOT USE SHUNT. Adjust for maximum amplitude and symmetry similar to Fig. 2.
3.	"	"	"	"	"	Vert. Amp. to point Ⓑ. Low side to chassis.	A12	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 3.

FM RF ALIGNMENT

Insert proper crystal in crystal socket nearest to antenna terminals.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4.				Not used	Not used	DC probe to point Ⓒ. Common to chassis.	A13	Adjust so that slug is fully counter clockwise. Readjust slug clockwise for maximum deflection and back-off approximately 1/2 turn.
5.				"	"	DC probe to point Ⓓ. Common to chassis.	A14	Adjust for maximum deflection.
6.	22Ω Carbon Resister	Across antenna terminals with 22Ω in high side (use short leads).	Freq. of signal desired (Unmod)	"	"	DC probe to point Ⓔ. Common to chassis.	A15, A16, A17	Adjust for maximum deflection in order given.
7.	"	"	Image freq. (Unmod) 21.4MC lower than desired freq.	"	"	"	A18	Adjust for MINIMUM deflection.
8.	"	"	Freq. of signal desired (Unmod)	"	"	"	A15	Readjust for maximum deflection.

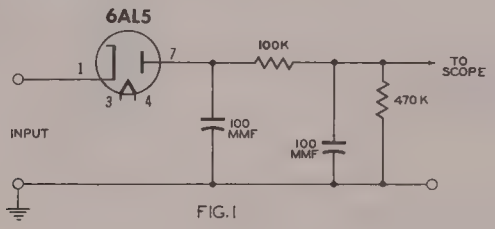


FIG. 1

FIG. 2

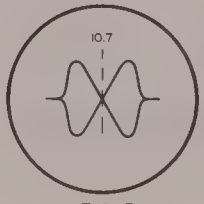


FIG. 3

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		Motorola PART No.	STANDARD REPLACEMENT	
V1	RF Amplifier	6BK7A	6BK7A	
V2	1st. Mixer	6U8	6U8	
V3	1st. OSC. Amplifier	6BK7A	6BK7A	
V4	High IF Amplifier	6BJ6	6BJ6	
V5	2nd. Mixer-2nd. Osc.	6U8	6U8	
V6	1st. Low IF Amplifier	6BJ6	6BJ6	
V7	2nd. Low IF Amplifier	6BJ6	6BJ6	
V8	Squelch Rectifier	6AL5	6AL5	
V9	FM Detector	6BN6	6BN6	
V10	1st. AF Amplifier-Squelch Amplifier	12AX7	12AX7	
V11	Output	6AQ5	6AQ5	
V12	Rectifier	5Y3GT	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA					NOTES
	CAP.	VOLT.	Motorola PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.	
C1A	40	250		AFB3-20	CU8	FF321	TM-402020-250	T-090	TVL-3570	
B	20	250	(Note 1)							
C	20	25								
C4A	40	250		AFB3-20	CU8	FF321	TM-402020-250	T-090	TVL-3570	
B	20	250	(Note 1)							
C	20	25								

Note 1: Some versions may use 40MFD in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA								NOTES
	CAP.	VOLT	Motorola PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.		
C2	3-13			NPO-DD10	TCZ-10	2D13	NPO1A-100	ZT-541			
C4	3-13			BPD-001	DD-102	K069	801-001	UC-521	5HK-D1		
C15	10			BPD-001	DD-102	K069	801-001	UC-521	5HK-D1		
C16	1000			BPD-001	DD-102	K069	801-001	UC-521	5HK-D1		
C17	1000			BPD-001	DD-102	K069	801-001	UC-521	5HK-D1		
C18	1000										
C19	3-13			BPD-001	DD-102	K069	801-001	UC-521	5HK-D1		
C20	1000			BPD-001	DD-102	K069	801-001	UC-521	5HK-D1		
C21	1000										
C22	14		100-203-3								
C23	3-13										
C24	27	500	35-006-270	1469-000027	TCZ-27	GR5Q27	NPO1-270	DC-525	5HK-D6	MS-427	
C25	5000	500		BPD-005	DD-502	K080	8L-005		5HK-D6	MS-427	
C26	27	500	35-006-270	1469-000027	TCZ-27	GR5Q27	NPO1-270	DC-525	5HK-D6	MS-427	
C27	5000			BPD-005	DD-502	K080	8L-005		5HK-D6	MS-427	
C28	14		100-203-3								
C29	1000			BPD-001	DD-102	K069	801-001	UC-521	5HK-D1		
C30	1000			BPD-001	DD-102	K069	801-001	UC-521	5HK-D1		
C31	1000			BPD-001	DD-102	K069	801-001	UC-521	5HK-D1		
C32	27	500	35-006-270	1469-000027	TCZ-27	GR5Q27	NPO1-270		MS-427		
C33	10000			BPD-01	DD-103	K082	81-01	DC-511	5HK-81		
C34	1000			BPD-001	DD-102	K069	801-001	UC-521	5HK-D1		
C35	100	500	35-006-101	BPD-000100	DD-101	K077	800-100	DC-510	5HK-D4		
C36	100			BPD-000100	DD-101	ER5T1	NPO-337-101	MC2S235	MS-31		
C37	1000			BPD-001	DD-102	K069	801-001	UC-521	5HK-D1		
C38	10000			BPD-01	DD-103	K082	81-01	DC-511	5HK-81		
C39	10000			BPD-01	DD-103	K082	81-01	DC-511	5HK-81		
C30	27		100-203-3		TCN-27	TN08					
C31	4	600		1469-000027	TCZ-27	GR5Q27	NPO1-270		MS-427		
C32	27	600	35-006-270	1469-000027	TCZ-27	GR5Q27	801-001	UC-521	5HK-D1		
C33	1000			BPD-001	DD-102	K069	NPO-337-101	MC2-235	MS-31		
C34	100	500	35-006-101	BPD-000100	TCZ-100	ER5T1		DC-511	5HK-81		
C35	10000			BPD-01	DD-103	K082	81-01	DC-511	5HK-81		
C36	10000			BPD-01	DD-103	K082	81-01	DC-511	5HK-81		
C37	10000			BPD-01	DD-103	K082	81-01	DC-511	5HK-81		
C38	10000			BPD-01	DD-103	K082	81-01	DC-511	5HK-81		

Note 2

CHASSIS—TOP VIEW

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	Monitoradio PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C39	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C40	100	500	35-006-101	NP0-S1100	TCZ-100	5R5T1	NP0-337-101	MCE235	MS-31	
C41	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C42	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C43	.05	200	35-001-503	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C44	100	500	35-006-101	NP0-S1100	TCZ-100	5R5T1	NP0-337-101	MCE235	MS-31	
C45	100	500	35-006-101	NP0-S1100	TCZ-100	5R5T1	NP0-337-101	MCE235	MS-31	
C46	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C47	.05	200	35-001-503	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	Note 3
C48	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C49	270			S1270	D6-271	TP41	GP2K-271	UC-5327	5GA-T27	
C50	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C51	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C52	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C53	1000			BPD-001	DD-102	K060	801-001	DC-521	5HK-D1	
C54	.1	400	35-002-104	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C55	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C56	.047	200	35-001-503	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C57	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C58	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C59	.1	400	35-002-104	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C60	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C61	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	

Note 2. Not used in some versions.
Note 3. Some versions may use a .01MFD unit in this application.

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	Monitoradio PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	300-268-1	B-70-S	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	Not Req.	SWE-12	76-1	US-26	Attach to R1A
R2A	25KΩ	½	300-268-2	B-27	A47-25K-V	Q14-120	U-28	Squelch
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3	300Ω	2	100-456		39-300			Buzz - wire wound

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	Monitoradio PART No.	IRC PART No.	NOTES
R4	470KΩ	½	35-011-474	BTS-470K	
R5	470KΩ	½	35-011-474	BTS-470K	
R6	10Ω	½	36-011-100	BTS-10	
R7	1000Ω 5%	½	35-011-102	BTS-1000 5%	
R8	100KΩ	½	35-011-104	BTS-100K	
R9	47KΩ	½	35-008-473	BTS-47K	
R10	100KΩ	½	35-011-104	BTS-100K	
R11	15KΩ	½	35-008-153	BTS-15K	
R12	100KΩ	½	35-011-104	BTS-100K	
R13	1000Ω 5%	½	35-011-102	BTS-1000 5%	
R14	1000Ω 5%	½	35-011-102	BTS-1000 5%	
R15	470KΩ	½	35-011-474	BTS-470K	
R16	8200Ω	2	35-010-822	BTB-8200	
R17	100KΩ	½	35-011-104	BTS-100K	
R18	330KΩ	½	35-008-334	BTS-330K	Note 1
R19	180KΩ	½	35-008-184	BTS-180K	
R20	47KΩ	½	35-008-473	BTS-47K	
R21	1000Ω 5%	½	35-011-102	BTS-1000 5%	
R22	15KΩ	½	35-008-153	BTS-15K	
R23	100KΩ	½	35-011-104	BTS-100K	
R24	330KΩ	½	35-008-334	BTS-330K	Note 1
R25	1Meg	½	35-011-105	BTS-1Meg	
R26	220KΩ	½	35-011-224	BTS-220K	
R27	330KΩ	½	35-008-334	BTS-330K	Note 1
R28	8200Ω	2	35-010-822	BTB-8200	
R29	82Ω	½	35-008-820	BTS-82	
R30	330KΩ	½	35-008-334	BTS-330K	Note 1

ITEM No.	RATING OHMS	RATING WATT	Monitoradio PART No.	IRC PART No.	NOTES
R31	220KΩ	½	35-011-224	BTS-220K	
R32	47KΩ	½	35-008-473	BTS-47K	Note 1
R33	18KΩ	2	35-010-183	BTB-18K	
R34	82Ω	½	35-008-820	BTS-82	
R35	470KΩ	½	35-011-474	BTS-470K	
R36	47KΩ	½	35-008-473	BTS-47K	
R37	100KΩ	1	35-009-104	BTA-100K	
R38	1000Ω 5%	½	35-001-102	BTS-1000 5%	
R39	180KΩ	½	35-008-184	BTS-180K	
R40	47KΩ	½	35-008-473	BTS-47K	
R41	8200Ω	2	35-010-822	BTB-8200	
R42	150KΩ	½	35-011-154	BTS-150K	
R43	4700Ω	½	35-011-472	BTS-4700	
R44	180Ω	½	35-008-181	BTS-180	
R45	22KΩ	½	35-011-223	BTS-22K	
R46	470KΩ	½	35-011-474	BTS-470K	
R47	2.2Meg	½	35-011-225	BTS-2.2Meg	
R48	2.2Meg	½	35-011-225	BTS-2.2Meg	
R49	220KΩ	½	35-011-224	BTS-220K	
R50	100KΩ	½	35-011-104	BTS-100K	
R51	220KΩ	½	35-011-224	BTS-220K	
R52	27KΩ	½	35-008-273	BTS-27K	
R53	180KΩ	½	35-008-184	BTS-180K	
R54	470KΩ	½	35-011-474	BTS-470K	
R55	330Ω	1	35-009-331	BTA-330	
R56	500Ω	10	35-014-1	3/4A-500	
R57	47KΩ	1	35-009-473	BTA-47K	
R58	27Ω	1	35-009-270	BTA-27	

Note 1. In some versions, values may be different or may be omitted.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	Monitoradio PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .65A	440VCT .114ADC	5VAC @ 2A	6.3VAC @ 3.64A	500-186-1					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	Monitoradio PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5.2KΩ	3.9Ω	300-310-1	Z1001	A-2930	A-3877	24S50	S-3X	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	Monitoradio PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	5"	PM	3.9Ω	750B12	5A1 ①	228S1	① Use Universal mounting bracket.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	Monitoradio PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	IF Trap	0Ω		150-027				
L2	FM Ant. Coil	0Ω		350-008-3				Tapped
L3	Fil. Choke	0Ω		300-303-2	19-1002		4606	2.1 Microhenries
L4	Neut. Coil	0Ω		100-462				
L5	FM RF Coil	0Ω		300-309-3				Tapped
L6	Crystal Osc. Cathode Coil	0Ω		300-307-1				
L7	Crystal Osc. Plate Coil	0Ω		150-333				
L8	FM Osc. Coil	0Ω		300-309-2				
L9	RF Coil	0Ω						Tapped
L10	1st. HF IF	.6Ω	.6Ω	300-077-1	16-3487	FM-254	1463	
L11	2nd. HF IF	.6Ω	.6Ω	300-077-1	16-3487	FM-254	1463	
L12	2nd. Osc. Plate Coil	0Ω		300-307-2				
L13	1st. LF IF	27Ω	27Ω	300-322-3	16-6758	BC-352	12-C1	
L14	2nd. LF IF	27Ω	27Ω	300-322-3	16-6758	BC-352	12-C1	
L15	3rd. LF IF	14Ω	14Ω	300-322-2	16-6758	BC-353	12-C2	
L16	Quadrature Coil	90Ω		350-000				

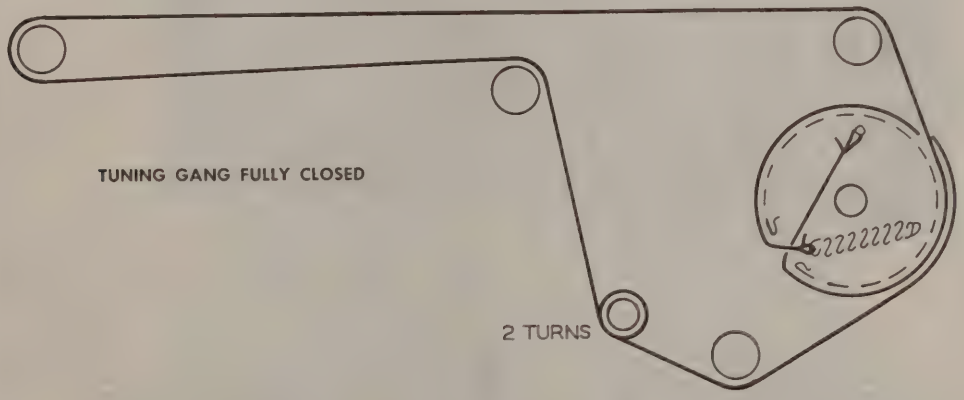
MISCELLANEOUS

ITEM No.	PART NAME	Monitoradio PART No.	NOTES
M1	Pilot Light		#47
M2	Neon Light		Type NE51 (Used in selective calling system)
M3	Switch		Pushbutton (used in selective calling system)
M4	Crystal	300-306	RF Osc. (Specify freq.)
M5	Crystal	300-304	IF Osc. - 10.245MC
	Knob	500-195-1	On-off-volume
	Knob	500-195-2	Squelch

PILOT
MODEL HF-56

PILOT
MODEL HF-56

TRADE NAME	Pilot Model HF-56		
MANUFACTURER	Pilot Radio Corp., 37-06 36th St., Long Island City 1, N.Y.		
TYPE SET	AC Operated AM-FM Superheterodyne Receiver		
TUBES	Fourteen		
POWER SUPPLY	105-120 Volts AC-60 Cycles	RATING	1.3 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540KC-1700KC	FREQ. MOD.	88MC-108MC



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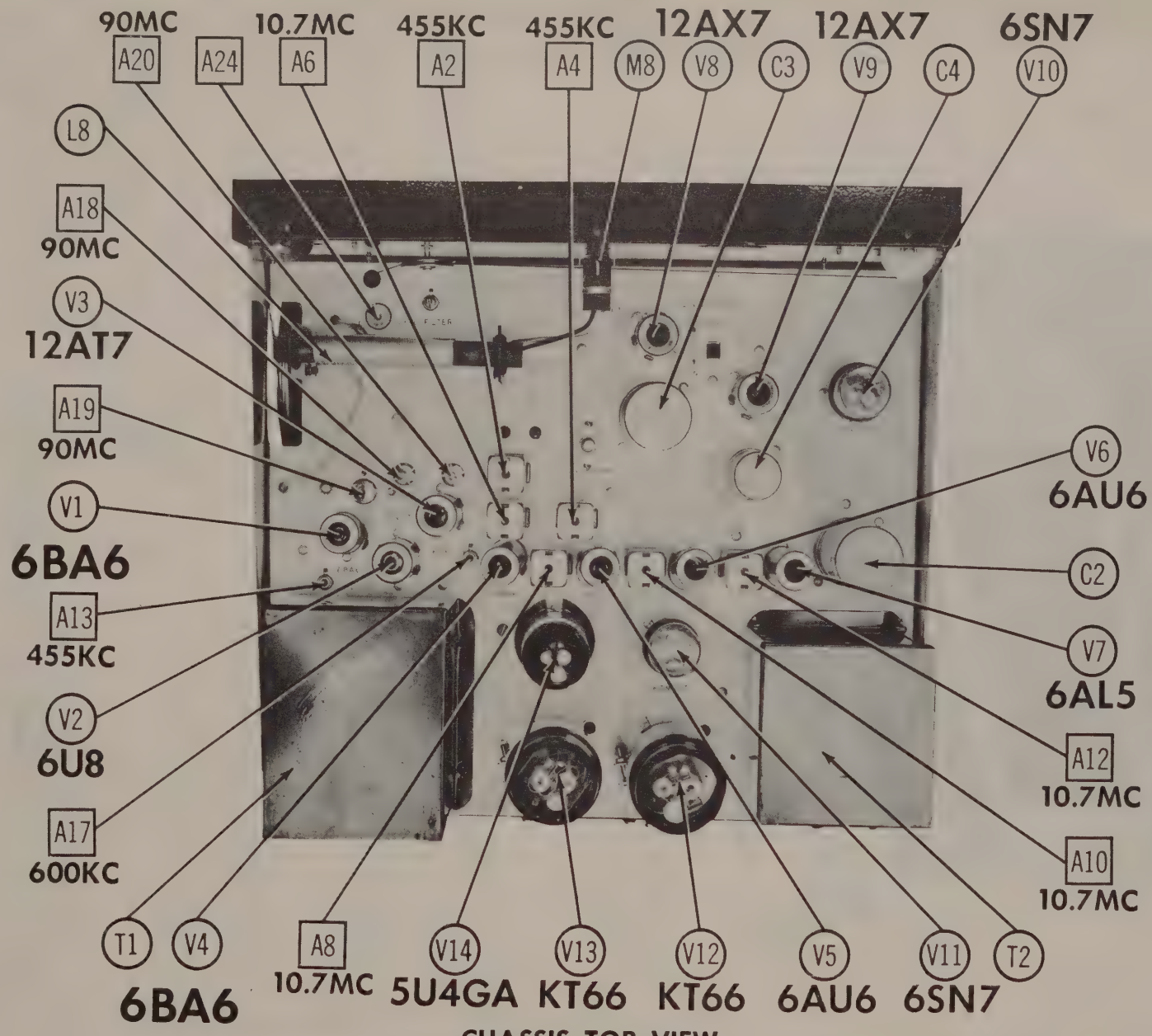
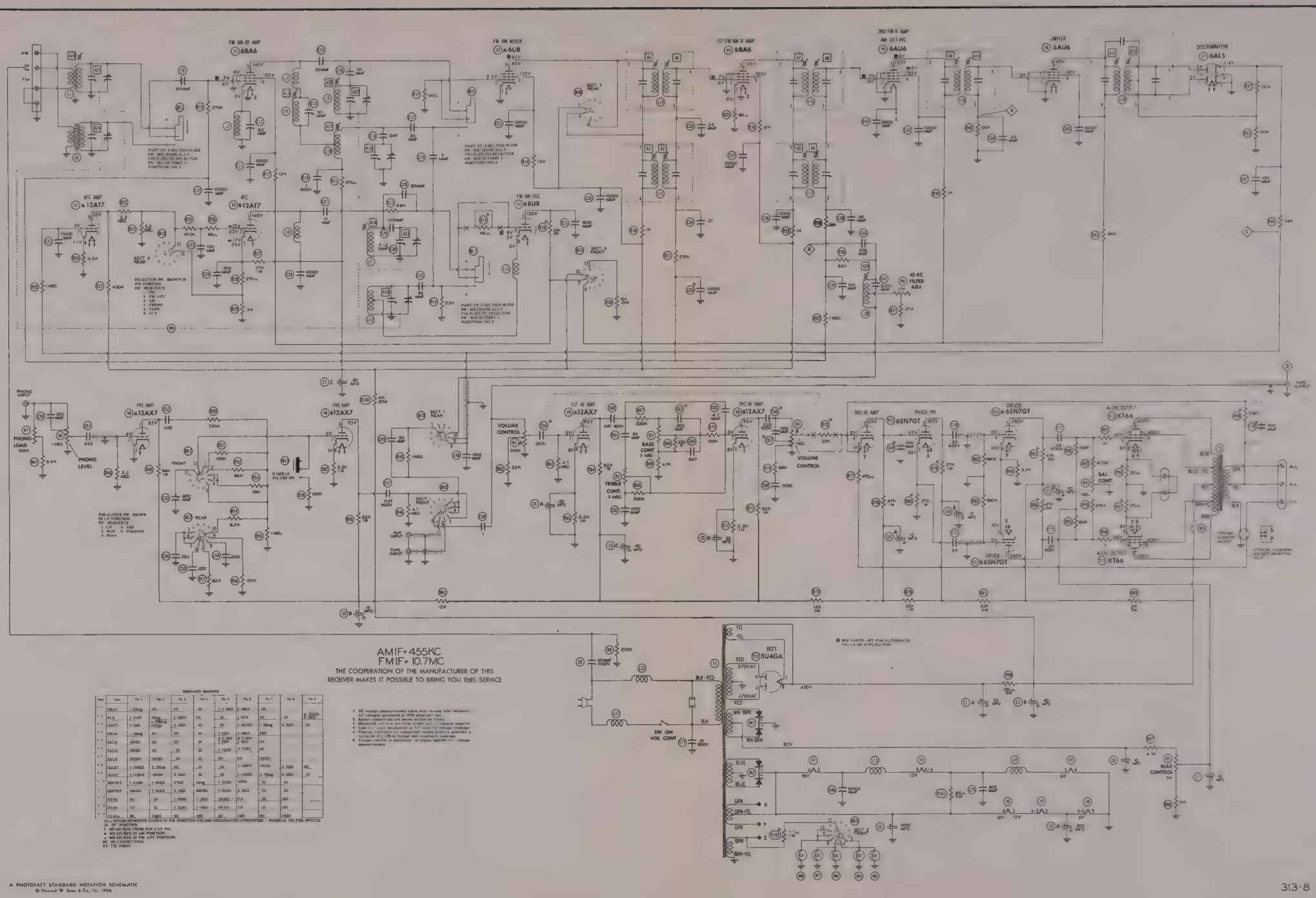


CHASSIS TOP VIEW


AM1F = 455KC
FM1F = 10.7MC
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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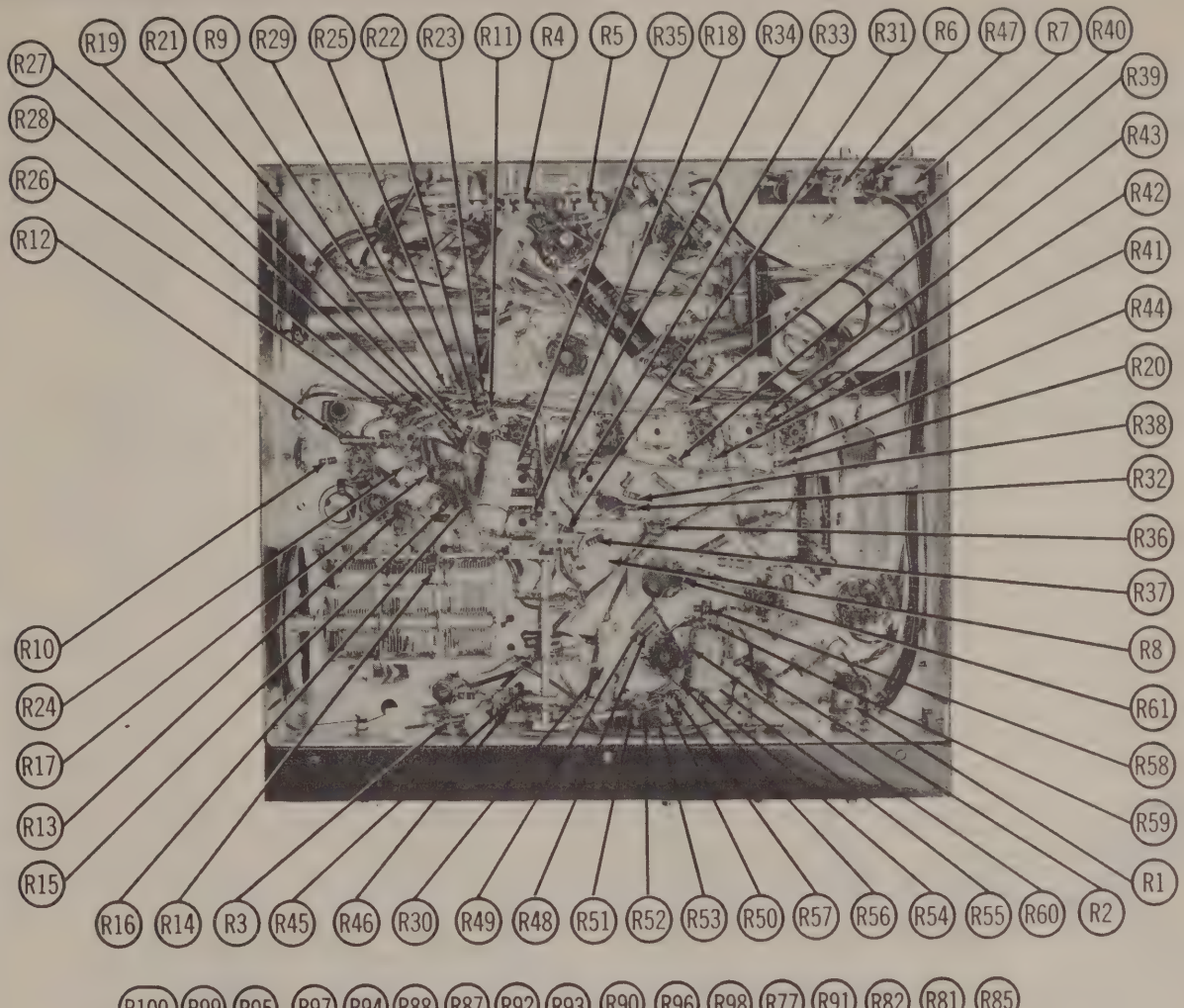
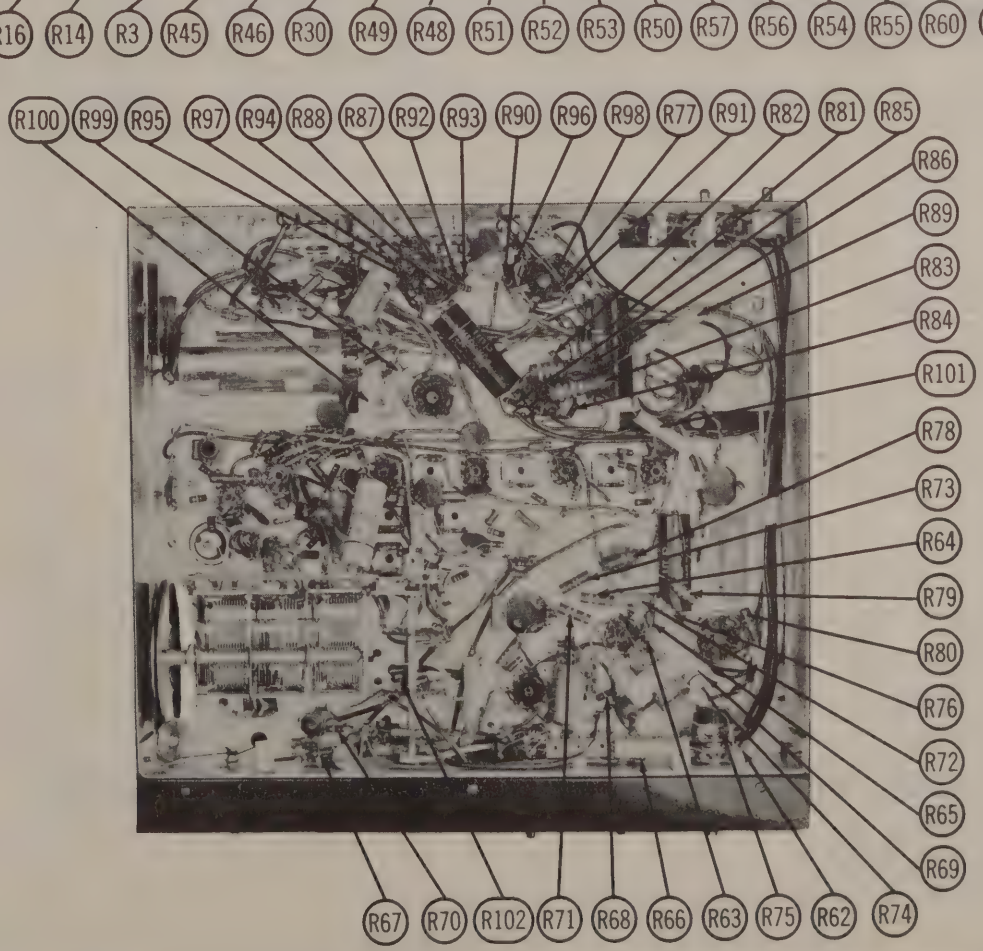


CHASSIS BOTTOM VIEW-RESISTOR IDENT.



CHASSIS BOTTOM VIEW-RESISTOR IDENT.

PILOT
Model HF-56

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Pointer should coincide with "0" on low end of linear logging scale.
Allow 30 minute warm-up period.

FM-AM-IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to pin 2 (grid) of 6U8 (V2). Low side to chassis.	455KC (400~ Mod.)	AM	550KC	DC probe to point (A). Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	"	"	10.7MC (Unmod.)	FM	88MC	DC probe to point (B). Common to chassis.	A5, A6, A7, A8, A9, A10	"
3.	"	"	"	"	"	DC probe to point (C). Common to chassis.	A11	"
4.	"	"	"	"	"	DC probe to point (D). Common to chassis	A12	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Repeat steps 3 and 4. Proceed with step 6

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
2.	.01MFD	High side to pin 2 (grid) of 6U8 (V2). Low side to chassis.	10.7MC (450KC Swp)	FM	88MC	Vert. Amp. to point (B). Low side to chassis.	A5, A6, A7, A8, A9, A10	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
3.	"	"	"	"	"	Vert. Amp. thru 100KΩ to point (C). Low side to chassis.	A11	"
4.	"	"	"	"	"	Vert. Amp. to point (D). Low side to chassis.	A12	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A11 for maximum amplitude and straightness of crossover lines.

10KC WHISTLE FILTER ADJUSTMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.		High side to point (A). Low side to chassis.	10KC	AM	550KC (off station)	Vert. Amp. to point (E). Low side to chassis.	A24 R8	Adjust for MINIMUM 10KC response.

FM-AM-RF ALIGNMENT

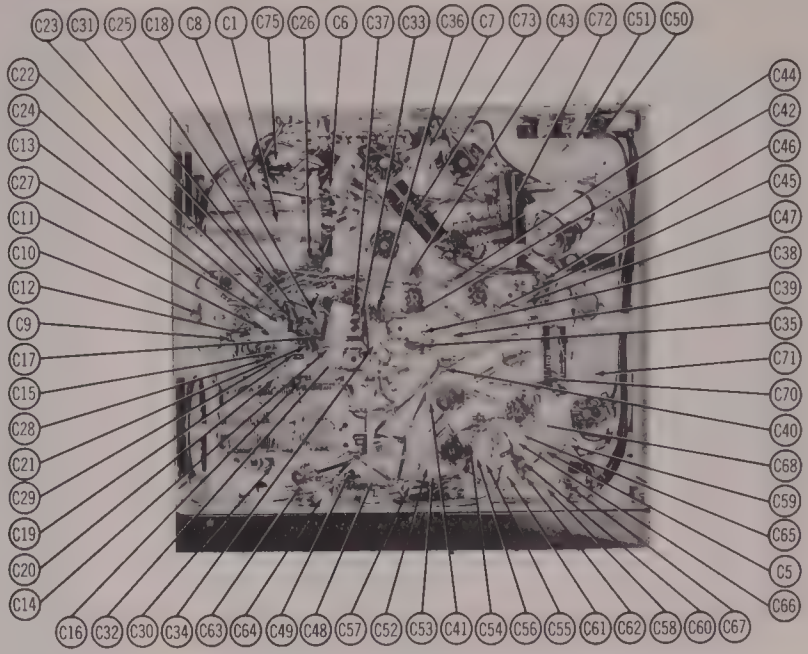
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	200MMF	High side thru 200MMF to AM Ant. terminal. Low side to chassis.	455KC	AM	550KC	DC probe to point (A). Common to chassis.	A13	Adjust MINIMUM deflection.
7.	"	"	1500KC	"	1500KC	"	A14, A15, A16	"
8.	"	"	600KC	"	600KC	"	A17	Adjust for maximum deflection while rocking tuning gang.
9.	270Ω Carbon Resistors	High side to FM antenna terminal. Low side to chassis.	90MC	FM (AFC off)	90MC	"	A18, A19, A20	Adjust for maximum deflection.
10.	"	"	106MC	"	106MC	"	A21, A22, A23	"

BALANCE AND BIAS ADJUSTMENT

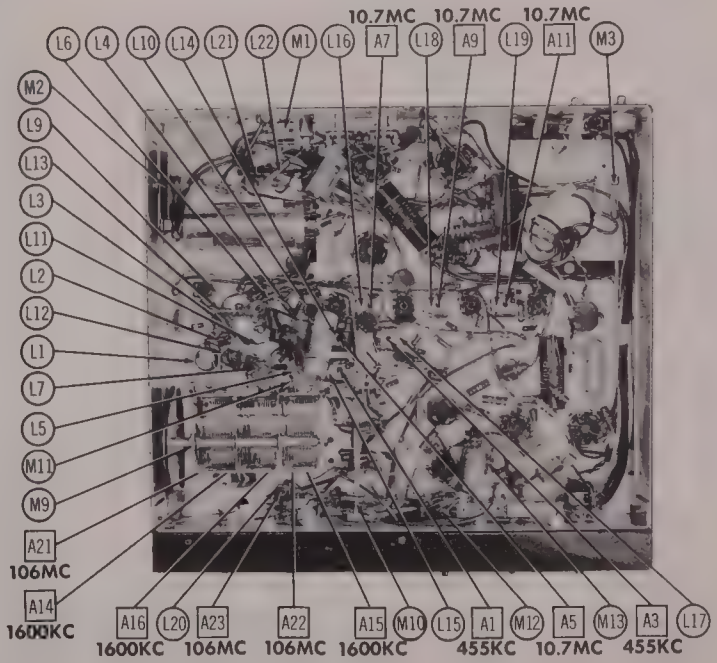
Balance-Remove jumper on meter terminal strip. Connect voltmeter across terminals. Adjust balance control for zero reading.
Bias-With jumper connected, connect voltmeter from jumper to chassis ground. Adjust bias control for 0.7 volts reading.

FIG. 1

FIG. 2



CHASSIS BOTTOM VIEW-CAPACITOR IDENT.



CHASSIS BOTTOM VIEW-INDUCTOR AND ALIGN. IDENT.

PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: PILOT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	FM-AM RF Amp.		6BA6	
V2	FM-AM Mixer -Osc.		6U8	
V3	AFC Amp.-AFC		12AT7	
V4	1st FM-AM IF Amp.		6BA6	
V5	2nd FM IF Amp. - AM Det. -AVC		6AU6	
V6	Limiter		6AU6	
V7	Discriminator		6AL5	
V8	Pre-Amplifier		12AX7	
V9	1st-2nd AF Amp.		12AX7	
V10	3rd AF Amplifier -Phase Inv.		6SN7GT	
V11	Driver		6SN7GT	
V12	Output		KT66	
V13	Output		KT66	
V14	Rectifier		5U4GA	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PILOT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲ 20	450		AFH4-18-50	CO36	FP448	TM-602020-450	Q-040	TVL-3789
B	■ 60	450			BR2045		TD-20-450	FM-4520	TVA-1709
C	20	450							
D	▲ 20	450							
C2	3000	25					TM-3000-25		
C3A	▲ 200	50				FP229, 9	TM-3142	T-735	
B	■ 10	400				TCD72		MTH-5010	
C	● 40	400							
C4A	▲ 10	450		AFH2-47	BO37	FP231	TM-D10-450	D-200	TVL-2750
B	■ 10	450							
C5A	20	10		PRS25V2020	BBRD2202	TCD26	TDL-D20-150	MTD-0220	TVA-2428
B	20	10							
C6	10	100		PRS150V10	BR1015	TC42	TD-10-150	FM-1512	TVA-1406
C7	10	100		PRS150V10	BR1015	TC42	TD-10-150	FM-1512	TVA-1406

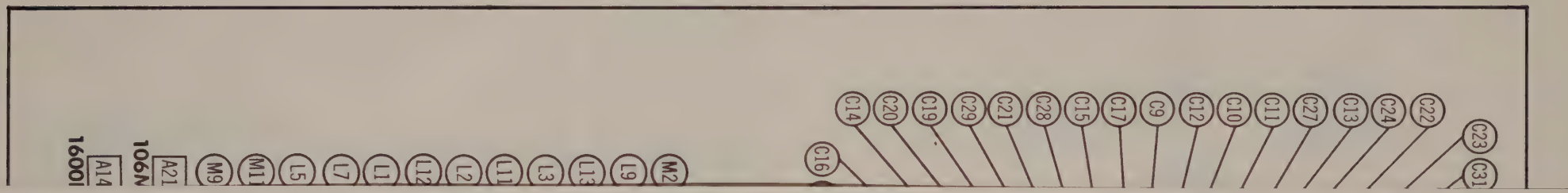
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PILOT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C8	30	1000		HVD-15-33	DD-330	VQ33	1R5KV-330	MCL427	10GA-Q33	
C9	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C10	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C11	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C12	82			SI82	D6-820	GO40	GP1K-820		5GA-Q82	

PARTS LIST AND DESCRIPTIONS (Continued)
CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PILOT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C13	50			NPO-SI50	TCZ-50	TZ23	NPO-338-500	ZT-545	5TCC-Q5	
C14	.1	600		P688N-1	DF-104	CUB2P1		PT601	6TM-P1	
C15	20			SI20	D6-200	TP22	GP1K-200	UC-542	5GA-Q2	
C16	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C17	20			SI20	D6-200	TP22	GP1K-200	UC-542	5GA-Q2	
C18	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C19	5			N750-SI5	TCN-5	NO11	N750A-050	NT-555	5TCU-V5	
C20	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C21	800			BPD-0008	DD-801	KO67	831-801	DC-521	5GA-T8	
C22	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C23	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C24	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C25	800			BPD-0008	DD-801	KO67	831-801	DC-521	5GA-T8	
C26	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C27	10									
C28	30				TCN-30	TNO9	N750K-300			
C29	100			NPO-SI100	TCZ-100	TZ30	NPO-337-101	ZT-531	5TCC-T1	
C30	3-12				822-FZ		557-3	ST-553-Z		
C31	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C32	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C33	33			SI33	D6-330	TP27	GP1K-330	UC-5433	5GA-Q33	
C34	.01	[illegible]		BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C35	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	Note 1
C36	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C37	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C38	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C39	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C40	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	
C41	2200	500								
C42	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C43	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C44	33			SI33	D6-330	TP27	GP1K-330	UC-5433	5GA-Q33	
C45	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C46	10000			BPD-01	DD-103	KO82	811-01	DC-511	5HK-S1	
C47	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C48	1500			SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C49	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C50	250			SI250	D6-251	TP40	GP2K-251	UC-5325	5GA-T25	
C51	.022	400		BPD-02	DD-203	CUB4S22	817-02	PT4122	4TM-S22	
C52	.022	600		BPD-02	DD-203	CUB6S22	817-02	PT6122	6TM-S22	
C53	800			BPD-0008	DD-801	KO67	831-801	DC-521	5GA-T8	
C54	.0051	400				1R5D51			MS-251	
C55	.022	400								
C56	.033	400								
C57	.047	600		BPD-05	DF-503	CUB6S5		PT6147	6TM-S47	
C58	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C59	.0051	400		SI5000	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	Note 2
C60	.047	600		BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C61	50			SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C62	1000			SI1000	D6-102	TP52	GP2L-102	UC-531	5HK-D1	



PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA PILOT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C63	1200			SI1200	D6-122	TP53	GP2L-122	UC-5212	5HK-D12	Note 3
C64	.047	400								
C65	4.7			NPO-SI4.7	TCZ-4R7	TZ07	NPOA-4R7	ZT-5547	5TCCB-V47	
C66	.022	600		BPD-02	DD-203	CUB6S22	817-02	PT6122	6TM-S22	Note 1
C67	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	Note 4
C68	.0022	400		SI2200	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C69	330			SI330	D6-331	TP43	GP2K-331	UC-5333	5GA-T33	Note 5
C70	.25	600		P688N-25		CUB6P25		PT6025	6TM-P25	
C71	.25	200		P288N-25		CUB2P25		PT4025	2TM-P25	
C72	.25	600		P688N-25		CUB6P25		PT6025	6TM-P25	
C73	.25	600		P688N-25		CUB6P25		PT6025	6TM-P25	
C74	500			SI500	D6-501	TP47	GP2K-501	UC-535	5GA-T5	Note 5
C75	.01	600		BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	

Note 1. Some versions use .047MFD in this application.
Note 2. Some versions use .01MFD in this application.
Note 3. Some versions use 1000MMF in this application.
Note 4. Some versions use 250MMF in this application.
Note 5. Not used in some versions.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PILOT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½	36-62					Volume Tapped at 200K & 350KΩ (Panel)
B	1Meg	½						Volume & Switch Tapped at 375K & 625KΩ (Rear)
R2A	5Meg	½	37-33	AB-88	A47-5Meg-Z	Q13-141	U-65	Treble
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R2A.
R3A	5Meg	½	37-33	AB-88	A47-5Meg-Z	Q13-141	U-65	Bass
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R3A.
R4A	1Meg	½	39-43	BX-69	A47-1Meg-S	Q11-137	TA16L	Balance
B	Shaft		Not Req.	Not Req.	FKS-1/4	RQ	Not Req.	Attach to R4A.
R5A	5000Ω	½	39-42	BX-10	A47-5000-S	Q11-114	TA53L	Bias
B	Shaft		Not Req.	Not Req.	FKS-1/4	RQ	Not Req.	Attach to R5A.
R6A	1Meg	½	39-47	ABT-74	A47F5-1Meg	Q19-137X	UT-443	Phono Level Tapped at 650KΩ
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R6A.
R7A	100KΩ	½	39-45	AB-40	A47-100K-S	Q11-128	U-41	Phono Load
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R7A.
R8A	10KΩ	½	39-38	B-14	A47-10K-S	Q11-116	U-20	10KC Filter Adjustment
B	Shaft		Not Req.	Not Req.	RS-2	Not Req.	Not Req.	Attach to R8A.

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA PILOT PART No.	IRC PART No.	NOTES
R9	270KΩ	½		BTS-270K	
R10	270KΩ	½		BTS-270K	
R11	470Ω	½		BTS-470	
R12	12KΩ	½		BTS-12K	
R13	6800Ω	½		BTS-6800	
R14	22KΩ	½		BTS-22K	
R15	68Ω	½		BTS-68	Note 1
R16	10KΩ	1		BTA-10K	Note 2
R17	1Meg	½		BTS-1Meg	
R18	1000Ω	½		BTS-1000	
R19	12KΩ	½		BTS-12K	
R20	1Meg	½		BTS-1Meg	
R21	430KΩ 5%	½		BTS-430K 5%	
R22	2.2Meg5%	½		BTS-2.2Meg5%	
R23	2.2Meg 5%	½		BTS-2.2Meg5%	
R24	4300Ω 5%	½		BTS-4300 5%	
R25	470KΩ	½		BTS-470K	
R26	68Ω	½		BTS-68	
R27	27KΩ	1		BTA-27K	
R28	270Ω	½		BTS-270	
R29	3000Ω 5%	½		BTS-3000 5%	
R30	6000Ω	10		1 3/4A-6000	
R31	270KΩ	½		BTS-270K	
R32	1Meg	½		BTS-1Meg	
R33	1000Ω	½		BTS-1000	
R34	12KΩ	½		BTS-12K	
R35	68Ω	½		BTS-68	
R36	82KΩ	½		BTS-82K	
R37	27KΩ	½		BTS-27K	
R38	39KΩ	½		BTS-39K	
R39	1000Ω	½		BTS-1000	
R40	150KΩ	½		BTS-150K	
R41	68KΩ	½		BTS-68K	
R42	100KΩ 5%	½		BTS-100K 5%	
R43	100KΩ 5%	½		BTS-100K 5%	
R44	39KΩ	½		BTS-39K	
R45	1Meg	½		BTS-1Meg	
R46	4.7Meg	½		BTS-4.7Meg	
R47	6800Ω	½		BTS-6800	
R48	2.2Meg	½		BTS-2.2Meg	
R49	68KΩ	1		BTA-68K	
R50	330KΩ	½		BTS-330K	
R51	100KΩ 5%	½		BTS-100K 5%	
R52	68KΩ 5%	½		BTS-68K 5%	
R53	39KΩ 5%	½		BTS-39K 5%	
R54	8200Ω 5%	½		BTS-8200 5%	
R55	1Meg	½		BTS-1Meg	

Note 1. Not used in some versions.
Note 2. Some versions use a 4700Ω 1W resistor in this application.
Note 3. R79, R80; R83, R86; R96, R97 must be matched pairs within 1%.
Note 4. Some versions use a 3300Ω ½W resistor in this application.
Note 5. Some versions use a 3Ω 1W resistor in this application.

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA PILOT PART No.	IRC PART No.	NOTES
R56	100KΩ 5%	½		BTS-100K 5%	
R57	82KΩ 5%	½		BTS-82KΩ 5%	
R58	100KΩ	½		BTS-100K	
R59	82KΩ	1		BTA-82K	
R60	3300Ω	1		BW1-3300	
R61	12KΩ	½		BTS-12K	
R62	22KΩ	½		BTS-22K	
R63	4.7Meg	½		BTS-4.7Meg	
R64	82KΩ	1		BTA-82K	
R65	2200Ω	1		BW1-2200	
R66	220KΩ	½		BTS-220K	
R67	220KΩ	½		BTS-220K	
R68	220KΩ 5%	½		BTS-220K 5%	
R69	4700Ω 5%	½		BTS-4700 5%	
R70	100KΩ 5%	½		BTS-100K 5%	
R71	82KΩ	1		BTA-82K	
R72	2200Ω	1		BW1-2200	
R73	12KΩ	1		BTA-12K	
R74	68KΩ	½		BTS-68K	
R75	22KΩ	½		BTS-22K	Note 1
R76	47KΩ	1		BTA-47K	
R77	470Ω	½		BTS-470	
R78	22KΩ	1		BTA-22K	
R79	27KΩ 5%	1		BTA-27K 5%	Note 3
R80	27KΩ 5%	1		BTA-27K 5%	Note 3
R81	22KΩ	3		BTB-22K	
R82	680KΩ	½		BTS-680K	
R83	47KΩ 5%	3		BTB-47K 5%	Note 3
R84	3300Ω	½		BTS-3300	
R85	680KΩ	½		BTS-680K	
R86	47KΩ 5%	3		BTB-47K 5%	Note 3
R87	4700Ω	½		BTS-4700	
R88	10KΩ	½		BTS-10K	
R89	2000Ω	5		PW7-2000	
R90	100KΩ 5%	½		BTS-100K 5%	
R91	1000Ω	½		BTS-1000	
R92	470KΩ	½		BTS-470K	
R93	100KΩ 5%	½		BTS-100K 5%	
R94	1000Ω	½		BTS-1000	
R95	470KΩ	½		BTS-470K	
R96	20Ω 5%	½		BW½-20 5%	Note 3
R97	20Ω 5%	½		BW½-20 5%	Note 3
R98	5600Ω	½		BTS-5600	Note 4
R99	100Ω	5		PW7-100	
R100	4000Ω	20		2D-4000	
R101	82Ω	5			
R102	2.7Ω	1			Note 5

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	PILOT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ⓟ 1.3A	725VCT ⓟ .093A	5V ⓟ 3A	6.3V ⓟ 1.15A	55-50					
		SEC. 4	SEC. 5	SEC. 6						
		6.3VCT ⓟ 3.85A	140VCT ⓟ .005A	32VCT ⓟ .97A						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	PILOT PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	7KΩ	16Ω Tap ⓟ 8Ω	56-45	H4111		A8072 ①			① Drill new mtg. holes.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	PILOT PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Coil	0Ω	0Ω	70-80				
L2	Cathode Choke	1Ω		75-33	19-1004		4529	5 Microhenries
L3	RF Coil	1Ω		75-33	19-1004		4529	5 Microhenries
L4	Fil. Choke	0Ω		75-19	19-1001		4604	1.6 Microhenries
L5	FM RF Coil	0Ω		71-40				
L6	RF Coil	1Ω		75-33	19-1004		4529	5 Microhenries
L7	FM Osc. Coil	0Ω		72-76				
L8	AM Ant. Coil	0Ω	0Ω	270-53				
L9	455KC Trap	26Ω		79-102				
L10	AM RF Coil	6.5Ω		71-41				Tapped ⓟ 2Ω
L11	RF Coil	1Ω		75-33	19-1004		4529	5 Microhenries
L12	AM Osc. Coil	2.4Ω		72-75	14-1033 *	BC-387 ■	71-Osc. ▲	Tapped ⓐ .4Ω
L13	Fil. Choke	0Ω		75-19	19-1001		4604	1.6 Microhenries
L14	1st FM IF	.7Ω	.7Ω	273-151	16-3487	FM-254	1463	
L15	1st AM IF	8.5Ω	8.5Ω	273-129	16-6758	BC-352	12-C1	
L16	2nd FM IF	.7Ω	.7Ω	273-151	16-3487	FM-254	1463	
L17	2nd AM IF	8.5Ω	8.5Ω	273-129	16-6758	BC-353	12-C2	
L18	3rd FM IF	.7Ω	.7Ω	273-151	16-3487	FM-254	1463	
L19	Discriminator	.8Ω	1Ω CT	279-77				
L20	10KC Filter	310Ω		79-106				Tapped ⓟ 140Ω
L21	Line Choke	0Ω		75-19	19-1001		4604	1.6 Microhenries
L22	Line Choke	0Ω		75-19	19-1001		4604	1.6 Microhenries

* Drill mounting hole.
■ Use secondary winding and drill mounting hole.
▲ Use primary winding and drill mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	PILOT PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.005A	110-502	1203	8RS050				① Use two.
M2	.97A	110-503		M1H ①				

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			PILOT PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	3AG P/T S/B	1/4A			315.250 (3AG P/T S/B 1/4A)		MDV 1/4	

MISCELLANEOUS

ITEM No.	PART NAME	PILOT PART No.	NOTES
M4	Dial Light	68-6	#47, FM
M5	Dial Light	68-6	#47, FM
M6	Dial Light	68-6	#47, AM
M7	Dial Light	68-6	#47, AM
M8	Dial Light	68-6	#47, Phono
M9	Tuning Cap.	26-59	6 Gang; AM Sections of Tuning Cap. (30-495MMF, 30-495MMF, 21-165MMF)
M10	Switch	100-105	Selector (Rotary-Wafer Type)
M11	Switch	100-38	AM-FM (3 Pole-3 Position, Slide Type) Mechanically Ganged to M10.
M12	Switch	100-103	Equalizer (Rotary-Wafer Type)
M13	Switch	101-41	Rumble Filter (SPST-Slide Type)

RCA VICTOR
MODEL SRT-403 (MI-15917)

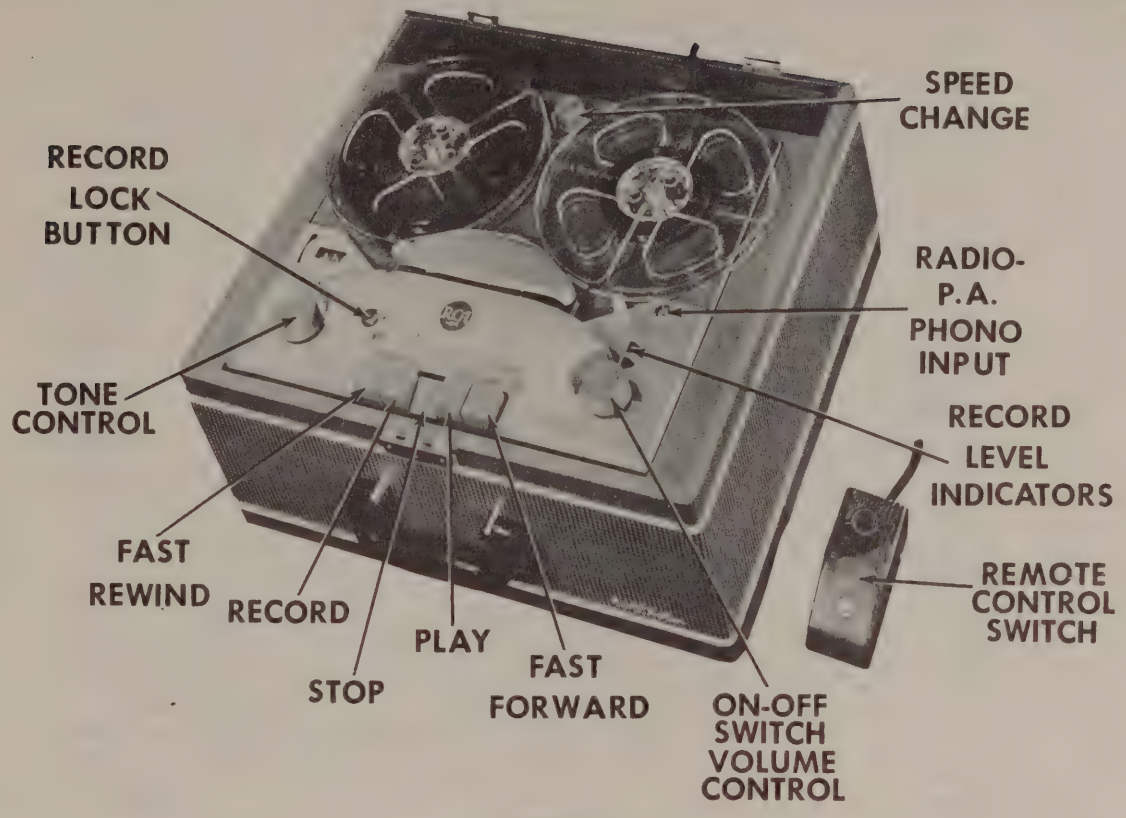


Figure 1

GENERAL INFORMATION

The RCA Models SRT-403 and SRT-403Q feature fingertip operation for Fast Forward, Playback, Stop, Record, and Fast Reverse. These recorders are designed to record and playback two tracks of material on standard width recording tape. Any reel size up to 7" can be used. Two neon recording indicators simplify the recording level setting. New recordings can be made on previously recorded tape since the erase head is automatically positioned when the "Record" button is pressed, or the same recording may be played back indefinitely. Recordings can be made from a radio, television receiver, or phonograph, in addition to those made directly from the microphone. Recordings can be played back through the self-contained speakers, or external speakers may be used by connecting to the "Ext. Spkr." jacks.

The RCA Models SRT-403 and SRT-403Q have two tape speeds, 3 3/4" and 7 1/2" per second. Using both tracks of the tape the recording time is as follows:

Size	3 3/4" Speed	7 1/2" Speed
5" reel (600 ft.)	1 hour	1/2 hour
7" reel (1200 ft.)	2 hours	1 hour

These units are designed to operate on 60 cycle, 115 volts, AC supply only. Before connecting to your line supply, be absolutely certain that it agrees with the above specifications.

Manufactured by:

Engineering Products Dept.
Radio Corp. Of America
Camden, N. J.

PROPERTY OF
L. F. ELECTRONICS
3301 INCA ST.
DENVER, COLORADO

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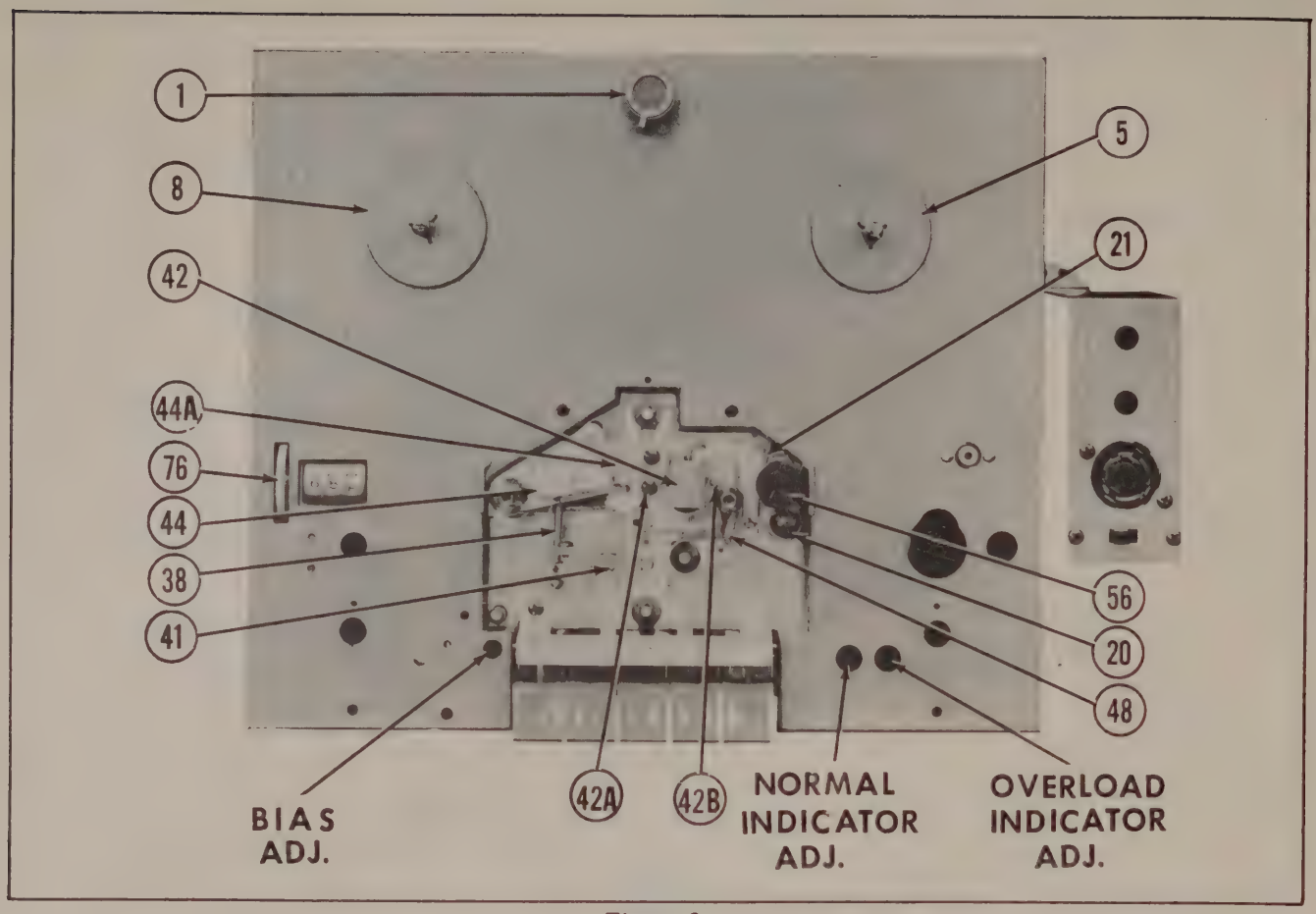


Figure 2

SPECIFICATIONS

Size: 10" x 15 7/8" x 14 1/4"
Weight: 35 lbs.
Speed: 3 3/4 and 7 1/2 IPS
Reel Capacity: Up to 7" Reel
Rewind Time: 1200' (7" Reel) in 2 3/4 min.
External Speaker Impedance: 3.2 ohms
Speakers: Three
Tube Complement: 5Y3, 12AX7, 12AY7, 6AQ5 (2)
Oscillator Frequency: 60KC

OPERATING INSTRUCTIONS

Preparation For Operation-

1. Remove the AC power cord, 7" reel of tape, empty reel and the microphone from the storage compartment.

2. Depress the "Stop" button.

3. Plug the AC cord into a convenient wall receptacle of the proper rating.

4. Set speed change knob to 7.50 or 3.75 as desired.

5. Place "Remote Control" switch in "Off" position.

CAUTION: Do not turn speed change knob unless "Stop" button is depressed.

When the Forward or Reverse button are depressed, the Record and Play buttons are locked so that they cannot be pressed down, with the possibility of spilling tape. The buttons should always be pressed down firmly until they latch and the Stop button must be depressed before changing functions or speeds of the recorder.

IMPORTANT: Always depress the Stop button when the machine is not in use.

Speed Change Knob-

The arrow on the speed change knob should point at 7.50 or 3.75 according to the speed desired. These recorders have two speeds, 7 1/2" and 3 3/4" per second. The arrow pointing at 7.50 means the unit will operate at the fast speed or 7 1/2" per second.

CAUTION: Turning the speed change knob while the unit is operating will not change the speed. The Stop button must be depressed before the speed can be changed.

Threading The Tape-

1. Place a full reel of tape on the left (supply) spindle, making certain one of the reel slots catch the protrusions of the pan. Unwind about 14" of tape from the supply reel.

2. Insert free section of tape into the tape slot.

3. Insert free end of tape into one of the three slots in the hub of the right (take-up) reel and while holding the tape in place give the reel two or three turns until the tape is secured.

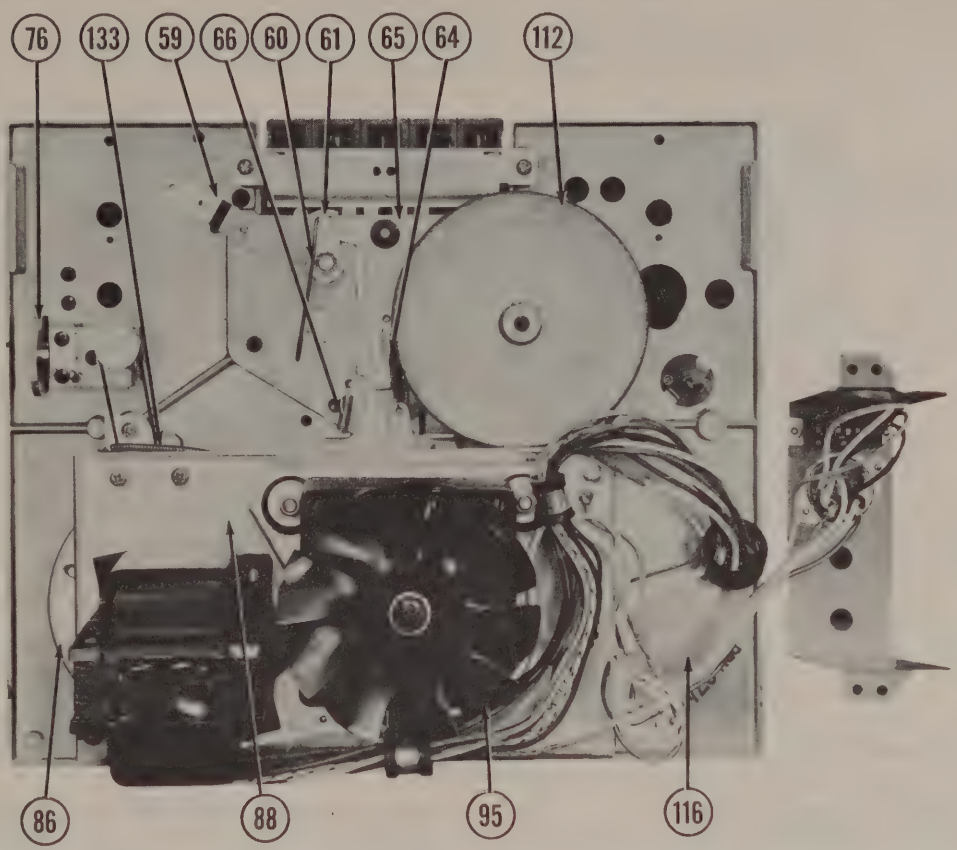


Figure 3

4. The dull side of the tape should always face away from the operator (rear of unit).

To Record From Microphone-

1. Turn the On-Off Volume control to the right until a click is heard and allow about 30 seconds for the unit to warm up. The pilot light located above the Stop Button will glow when the unit is turned on.

2. Insert the microphone plug into the "Microphone" input.

3. Move the record lock button (9) downward with the left hand. This releases the safety lock which prevents accidental erasure.

4. Depress the "Record" button with the right hand (while holding record lock button (9) with the left hand) until it latches.

5. Adjust the "Volume" control until the "Normal" indicator just flashes, while speaking into the microphone. When the "Volume" control is advanced too far the "Overload" indicator will flash and the recording will be distorted. To prevent overload, lower the "Volume" control to a point where the "Overload" indicator will not flash.

6. The "Tone" control does not operate during recording. When recording from radio, set the radio "Tone" control for maximum treble.

To Record From External Radio, TV, Or Phonograph-

1. Insert the phonograph pickup plug into the "Radio"-P. A. -"Phono" jack.

2. For radio or TV recording, connect patch cord, Part No. 204215 to the voice coil of the radio or TV receiver speaker by means of the alligator clips. Plug into "Radio-P. A. -Phono" jack.

3. Proceed as described under "To Record From Microphone".

NOTE: Remove patch cord after recording is completed.

To Use Second Track-

1. Depress the "Stop" button when all the tape has wound onto the take-up reel.

2. Remove reel containing tape and place on left-hand supply reel.

3. Place empty reel on right-hand take-up pan.

4. Thread tape as previously described.

To Play Recordings-

1. Turn on unit with "Volume" control knob.

2. Thread tape as described under "Threading The Tape".

3. Set the speed change knob (1) to the speed at which the recording was made.

4. Depress "Play" button until it latches.

5. Adjust "Volume" and "Tone" controls to desired listening level.

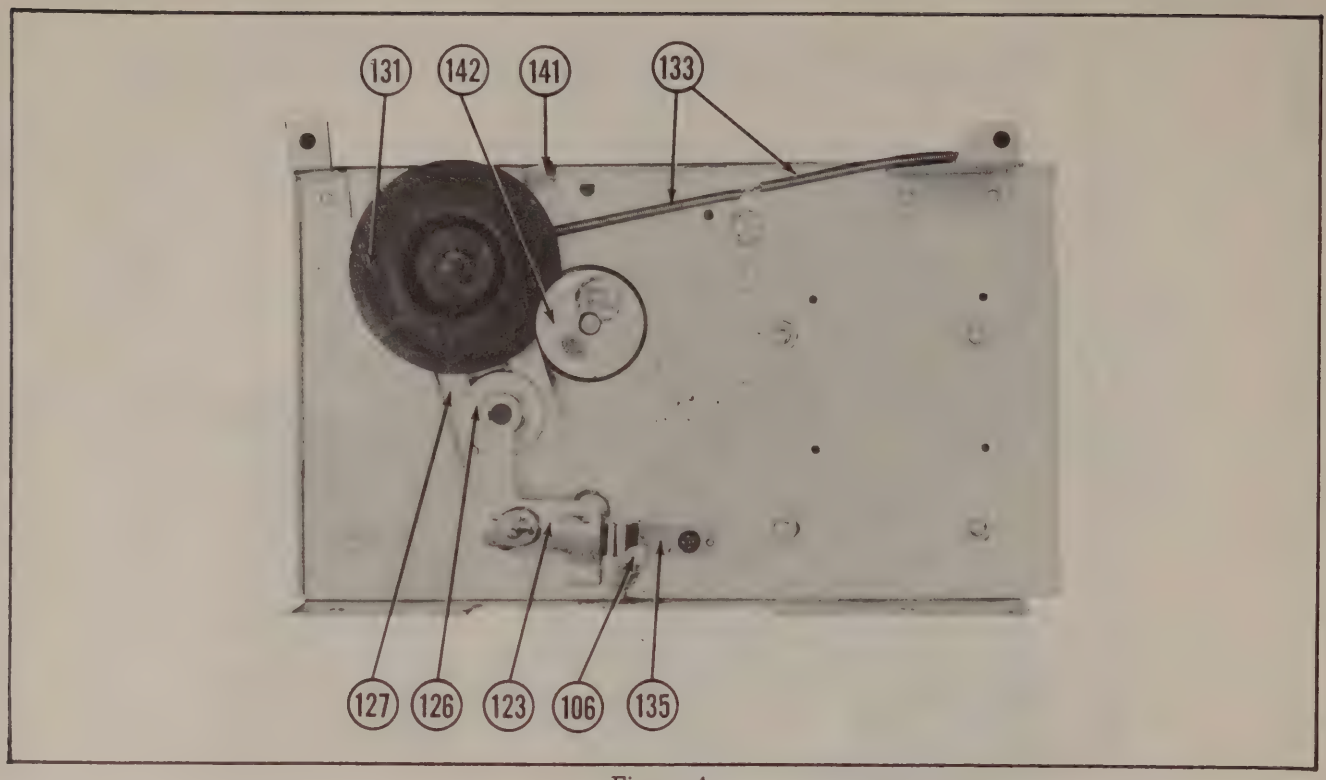


Figure 4

High-Speed Forward Or Reverse-

When it is desirable to play a certain portion of the tape over again it is not necessary to rewind the entire tape. By depressing the "Forward" or "Reverse" button the tape will advance (or reverse) at a rapid speed.

Several minutes of normal recording can be skipped in a few seconds by the "Reverse" and "Forward" buttons.

Tape Timer-

The tape timer provides complete selectivity and immediate location of any part of recorded tape. By turning the indicator to zero when beginning each reel, the numerals on the indicator will act as a ready reference to any desired portion of the recorded tape. Permanent records of this may be kept on the tape box enabling you to pin-point your favorite selections.

To Edit And Splice Tape-

NOTE: Since it is impossible to edit and splice one track without affecting the other, recordings which are to be edited should be limited to one track only.

1. The tape may be edited by cutting out unwanted portions, or by joining selections into another sequence. Announcements may be inserted between selections, etc. Unused sections of tape can be spliced together for re-use.

2. For best results, cut tape at a slight diagonal, join ends together with splicing tape on the glossy side and trim off any excessive width.

Erasing Recorded Material-

When the record button is depressed, the erase head is automatically positioned, erasing any previous recording before a new one is made. You may erase material no longer needed, without recording, by depressing the "Record" button and turning the "Volume" control knob to the minimum volume position or extreme counter-clockwise position just before the recorder shuts off. One track is erased at a time. To erase the second track, reverse the reels and repeat the above operation.

To Use As A Public Address System-

Insert the microphone plug into the "Microphone" input jack. Plug in an extension speaker or speakers if desired and depress the "Record" button. Set the "Volume" and "Tone" controls to the desired listening level. A recording can be made at the same time with a tape placed on the unit in the normal manner.

CAUTION: When using the public address feature, see that the microphone is as far away from the speakers as possible, to prevent "feedback" squeal.

Remote Control Operation-

A socket and switch are provided to allow remote operation up to a distance of 15 feet, either recording or playback. This is accomplished by means of a remote control cable. Connect attachment cord as follows:

1. Insert remote control cable plug into remote socket. Be sure remote control switch on end of cable is in "Off" position.

2. With control switch on the recorder in "Off" position start the unit in the regular manner and set "Volume" control to the proper level.

3. Place control switch on the set to "On" position. Tape will come to a stop.

The recorder can now be operated (start and stop) by means of the remote cable switch. When starting the recorder by means of the remote control, the switch should be rotated to the "Motor" position and then after a slight pause rotated to the "Record-Play" position. To stop recording or playback, rotate the control switch directly to "Off" position, pausing slightly at the "Motor" position.

ADJUSTMENTS

Disassembly Instructions-

1. Remove two screws located in storage compartment.

2. Remove push-on type volume and tone control knobs.

3. Remove two screws located under volume and tone control knobs, remove front escutcheon.

4. Remove two hex head screws located under front escutcheon.

5. Remove the wood screws holding remote control panel to bottom of case.

6. Lift unit out of case, removing leads from speakers before removing unit completely.

Record-Playback Head Adjustment-
(See Exploded View)-

To adjust the record-play-head (42) for maximum frequency response, make the following adjustment:

1. Remove the rear escutcheon (12).

2. Properly thread an alignment tape or a good recorded tape on the machine.

3. Set the controls as described under "To Play Recordings".

4. To adjust for maximum output of all frequencies, loosen bracket mounting screw (42A) and rotate bracket slightly until maximum output is obtained. Tighten screws (42A) after adjustment.

To adjust for maximum high-frequency response on early production grip the vertical portion of the record/playback head mounting bracket with a pair of long-nosed pliers. Rock the mounting bracket and record head from side to side slightly until the maximum high frequencies are obtained. Bend the bracket with the pliers to obtain a permanent set at this position.

To adjust for maximum high-frequency response on late production (see figure 2) turn adjusting screw (42B) as required until the maximum high-frequency output is obtained.

Pressure Pad Adjustment-
(See Exploded View)-

1. Remove the front escutcheon (13).

2. Depress the "Play" button. Do not turn recorder on.

3. Use a pencil type postal scale and check the amount of pressure necessary to just pull the pad away from the tape. The test should be made on the end of the pressure pad mounting spring (49). Adjust the pressure pad for 1 3/4 oz. $\pm$ 1/4 oz.

Hum Control Adjustment-

It is very important for recording purposes that the hum control be correctly adjusted. Hum that is present during recording will be amplified during playback.

To set the hum control turn the unit "On" and allow the tubes to warm up, advance the volume control to approximately mid-position and adjust the hum control (R3) for minimum hum.

(a)The record head pressure pad is adjusted by the locked adjustment screw (41).

(b)The guide post pressure pad (40) is adjusted by bending the pressure pad spring. It must be adjusted for minimum pressure against the tape.

4. After the adjustments are made depress the "Stop" button and replace the front escutcheon.

Erase Head Adjustment-

1. With tape properly threaded, turn recorder on and depress the "Record" button. Allow tape to run for a few seconds then turn recorder off, but leave "Recorder" button depressed.

2. With the escutcheons removed check the erase head (44) to see if it is parallel with the tape.

3. Check to see if the top edge of the tape coincides with the top end of the diagonal slot in the erase head (junction of long diagonal slot and short vertical slot). To adjust level of tape, loosen set screw (33), see exploded view, and rotate tape guide post (34) to move tape up or down. Tighten set screw (33).

4. After this adjustment has been made, check to see if the tape moves forward approximately 1/64" when the "Record" button is depressed. If not, loosen the forward adjustment screw (44A), see Figure 2 and turn the screw in or out as required to obtain this 1/64" movement. Tighten the lock nut.

Brake Shoe Adjustment-

1. In order to adjust the brake shoes, the complete mechanism must be removed from the carrying case and the speakers disconnected.

2. With all push buttons in the up position the brake shoes (68) should clear the drums by approximately 1/8".

3. Depress the "Stop" button while observing the brake shoes. Both brake shoes must contact the drums at the same time and with equal pressure.

4. The adjustment is accomplished by bending the spring arm (67).

Adjustment For Slow Take-Up Reel-

There are some instances where the spring drive belt (21), see Figures No. 2 and No. 6A, stretches after a period of time. When this happens, the take-up

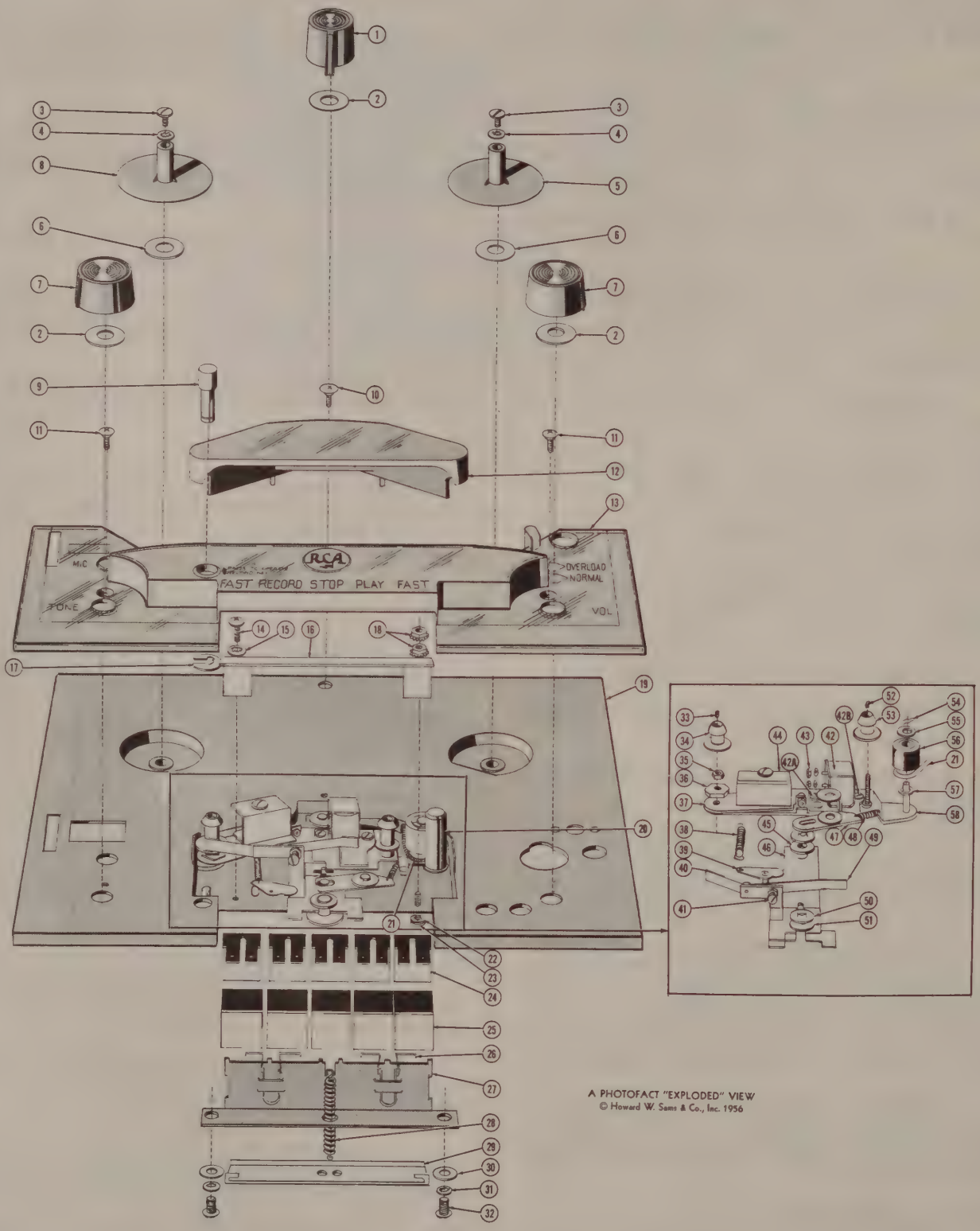


Figure 5A. Exploded View of Parts Above Baseplate.

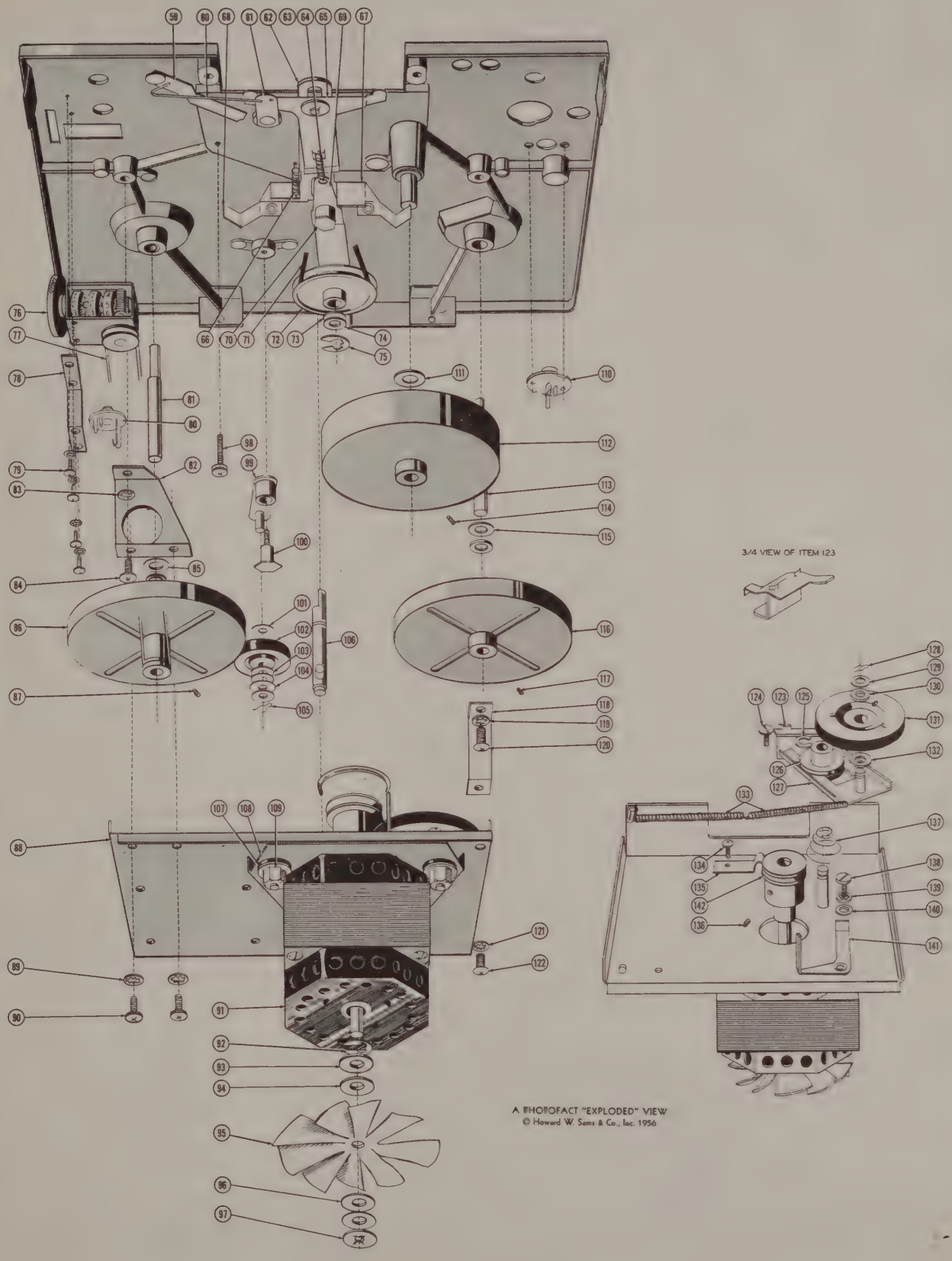


Figure 5B. Exploded View of Parts Below Baseplate.

torque will be insufficient to wind tape properly onto the takeup reel. In this case, the belt should be replaced as follows:

Remove rear escutcheon (12). Remove take-up reel pan (5). With the "Stop" button depressed, remove old spring drive belt from around pressure roller (56) and lift belt clear of recorder. Install new belt by reversing the above procedure.

Bias Adjustment-

Turn the recorder on and depress the "Record" button; use no tape. To determine if the bias is within satisfactory limits without dismantling the unit, merely connect a VTVM from the top lug of the recording head to chassis. If 75 to 100 volts are present no adjustment is necessary.

If the readings are outside of this range, proceed as follows:

1. Try new 12AY7, 12AX7, 6AQ5 and 5Y3.

2. If still not within range, remove the chassis shield and connect a low capacity VTVM from test point "A" to chassis. Use low scale. Adjust trimmer M8 for maximum reading. Adjust trimmer M7 to obtain a reading to 2.25 volts. This provides the optimum in performance.

Neon Record Level Indicators

The neon record indicator firing level adjustment is only required if a neon bulb is replaced. The two neon indicators are adjusted for correct firing level by means of two trimmer capacitors, one for each indicator.

To adjust indicators proceed as follows:

1. Turn recorder on an depress "Record" button.

2. Connect a short jumper lead across the bias oscillator coil, L1 (short out the coil to disable the oscillator.)

3. Connect an audio oscillator, set at 1000 cycles, into the microphone input jack. Output of audio oscillator should be approximately .01 volt. (A1 volt output level may be used with a 100 to 1 reduction pad of resistors inserted between the audio oscillator and the microphone jack).

4. Connect probe of low capacity type AC VTVM to test point "B" (junction of two 330KΩ resistors, R32 and R34, mounted on a terminal strip near the volume control).

5. Adjust volume control to obtain a reading of 36 volts on VTVM and leave control set and VTVM connected.

6. Disconnect shorting jumper from across bias oscillator coil.

7. Adjust "Normal" indicator trimmer M9A fully clockwise and then turn slowly counterclockwise so that upon loosening the trimmer the "Normal" bulb barely lights. This adjustment must be made loosening the trimmer.

8. Short out the bias oscillator coil.

9. Increase volume control to obtain a reading of 88 volts on the VTVM.

10. Remove short from bias oscillator coil.

11. Adjust "Overload" indicator trimmer M9B as described in step "7" for just barely lighting the "Overload" indicator bulb.

IMPORTANT: Do not readjust the recording bias oscillator after setting the indicator light adjustments.

TROUBLES

Push Buttons Fail To Latch Into Position-

1. Lock plate spring (28) loose or broken, resulting in the lock plate not being held against the hinge bracket (27).

Fails To Erase-

1. Spring (38) loose or broken, resulting in the erase head (44) not being pulled forward to engage the tape.

2. Erase head not aligned properly. See "Erase Head Adjustment".

Speed Variation Or "Wow-

1. Check the capstan (20), pinch roller (56), idler wheel (131), motor pulley (142), and flywheel (112) for oil or foreign material on these driving surfaces. Clean these parts with a good cleaning fluid.

2. Check motor pulley (142) to see if it is secured to motor shaft.

3. Check idler tension springs (133); see if they are holding idler wheel (131) in firm contact with motor pulley (142) and flywheel (112).

4. Idler slide plate (127) binding on slide bushing (126), preventing idler wheel (131) from making positive contact with the motor pulley and flywheel.

No Fast Forward Or Reverse-

1. Idler lever tension spring (64) may be loose or broken; if so, idler lever (69) will not be actuated.

2. Check idler drive belt (71) to see if it is properly connected.

No Drive On Record Or Playback-

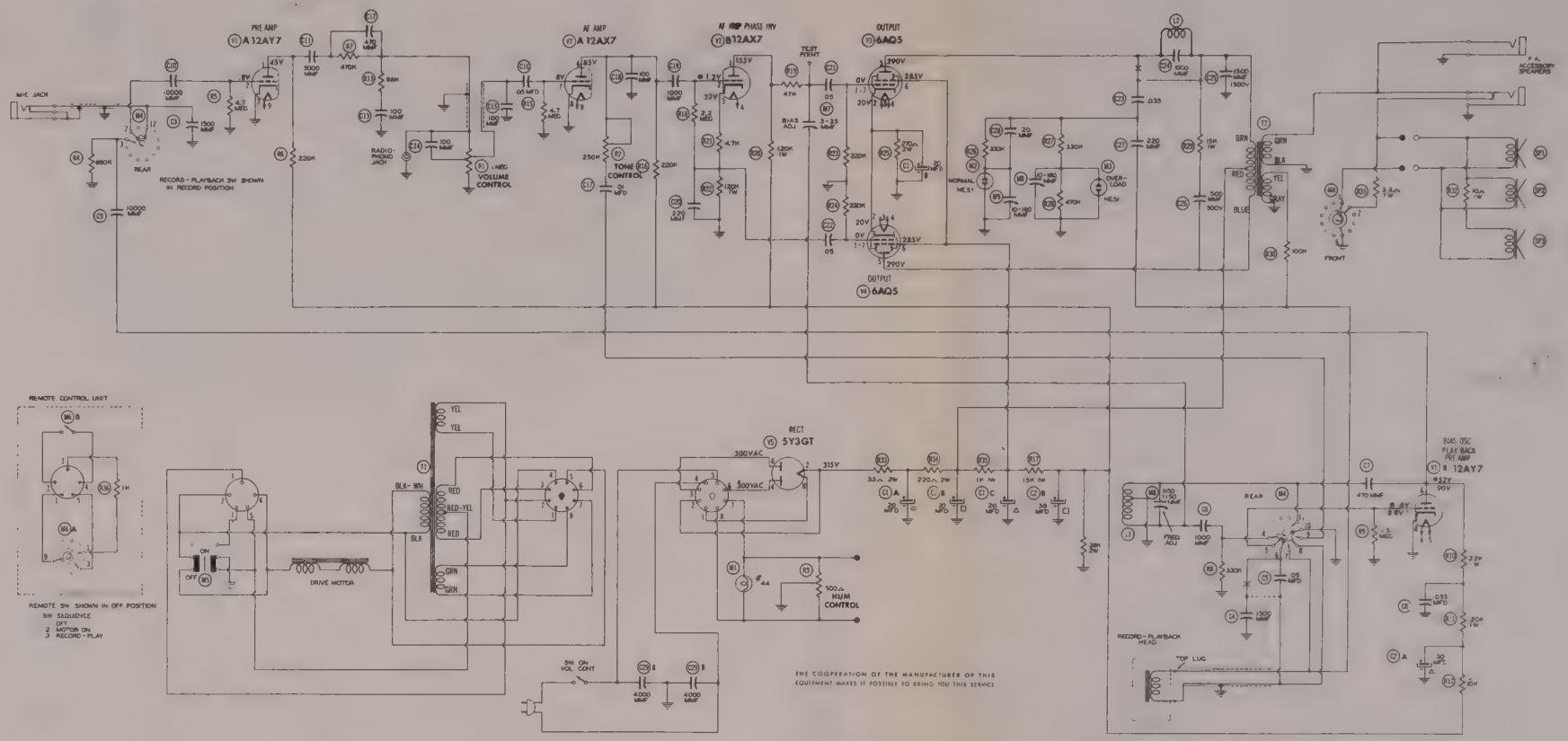
1. Idler tension springs (133) loose or broken, thereby not holding idler wheel (131) in engagement with motor pulley (142) and flywheel (112).

2. Idler slide plate (127) binding on slide bushing (126), thus preventing idler wheel (131) from moving forward.

Tape Fails To Wind On Take-Up Reel During Record Or Playback-

1. Reel drive spring (20) loose or broken. See "Adjustment For Slow Take-Up Reel".

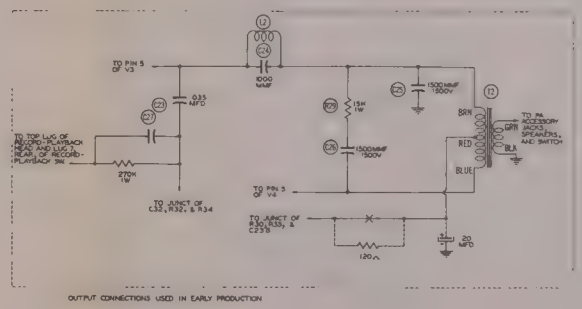
2. Brake drum shaft (113) binding. Clean foreign matter from bearing surface.



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AY7	† 236KΩ	4.7Meg	0Ω	125Ω	125Ω	† 168KΩ	■1.5Meg 300KΩ	0Ω	125Ω
V 2	12AX7	† 136KΩ	2.3Meg	124KΩ	125Ω	125Ω	† 236KΩ	4.7Meg	0Ω	125Ω
V 3	6AQ5	220KΩ	270Ω	125Ω	125Ω	† 500Ω	† 1.2KΩ	220KΩ		
V 4	6AQ5	220KΩ	270Ω	125Ω	125Ω	† 500Ω	† 1.2KΩ	220KΩ		
V 5	5Y3GT	NC	40KΩ	TP	110Ω	TP	110Ω	TP	40KΩ	

ALL MEASUREMENTS TAKEN IN RECORD POSITION UNLESS DESIGNATED OTHERWISE.
† MEASURED FROM PIN 2 OF V5.
■ MEASURED IN PLAY POSITION.
◆ MEASURED FROM PIN 3 OF V2.
TP-TIE POINT
NC-NO CONNECTION


TO PIN 5 OF V3
TO TOP LUG OF RECORD-PLAYBACK HEAD AND LUG 7 REAR OF RECORD-PLAYBACK SW
TO JUNCT OF C32, R32, & R34
TO PIN 5 OF V4
TO JUNCT OF R30, R33, & C29
TO P.A. ACCESSORY JACKS, SPEAKERS, REC SWITCH
OUTPUT CONNECTIONS USED IN EARLY PRODUCTION

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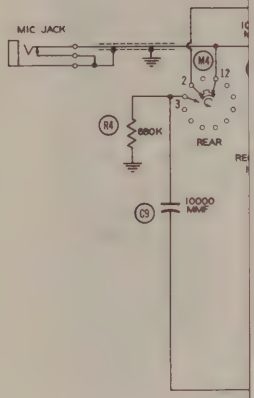

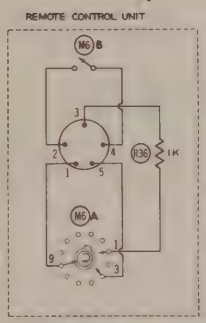

REMOTE SW. SHOWN IN OFF POSITION
SW SEQUENCE:
1. OFF
2. MOTOR ON
3. RECORD - PLAY

Item	Tube	
V 1	12AY7	†
V 2	12AX7	†
V 3	6AQ5	22
V 4	6AQ5	22
V 5	5Y3GT	N

AL
† M
■ M
M
T
N

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Tape Overruns Or Spills When Stop Button Is Depressed During Fast Forward Or Rewind-

1. Brake shoes out of adjustment. See "Brake Shoe Adjustment".

2. Brake Pads worn out. Replace pads.

Fails To Record-

1. Tape pressure pad not adjusted properly, resulting the tape not being held against the recording head. See "Pressure Pad Adjustment".

2. Record head (42) loose on its mounting. Adjust head and tighten into position as described under "Record-Play Head Adjustment".

3. Check the recording tape to see if the dull coated side faces inward on the reel. If the dull side faces outward, a recording cannot be made. If this condition exists, wind the tape onto an empty reel.

CLEANING

The record head, capstan and pressure roller are subject to an accumulation of tape coating residue, which is worn off the tape as it passes these parts. Use a soft cloth and alcohol to clean the head surfaces, capstan and pressure roller.

CAUTION: Do not use a brush when cleaning the recording head as this could possibly mar the metal pole piece.

LUBRICATION

All rotating parts are provided with generous size oilite bearings, which are factory lubricated and require no further attention.

An occasional cleaning out of foreign matter under the plastic push button cover is desirable, and a small drop of oil on the sliding lever members is advisable.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		RCA Victor PART No.	STANDARD REPLACEMENT	
V1	Pre Amplifier			
	Bias Oscillator — Pre-Amp.	12AY7	12AY7	
V2	AF Amplifier			
	Phase Inverter	12AX7	12AX7	
V3	Audio Output	6AQ5	6AQ5	
V4	Audio Output	6AQ5	6AQ5	
V5	Rectifier	5Y3GT	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	RCA Victor PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲20	450	94451	AFH9-67	D052	FP376.5 TC26	TM-4019	Q-340	TVL-4763
B	■20	450							
C	▲20	450							
D	20	25							
C2A	▲30	250	98787	AFH3-89	C067	FP331	TM-3200	T-340	TVL-3513
B	■30	250							
C	30	25	(Note 1)						

Note 1. C2C Is Not Used.

FIXED CAPACITORS

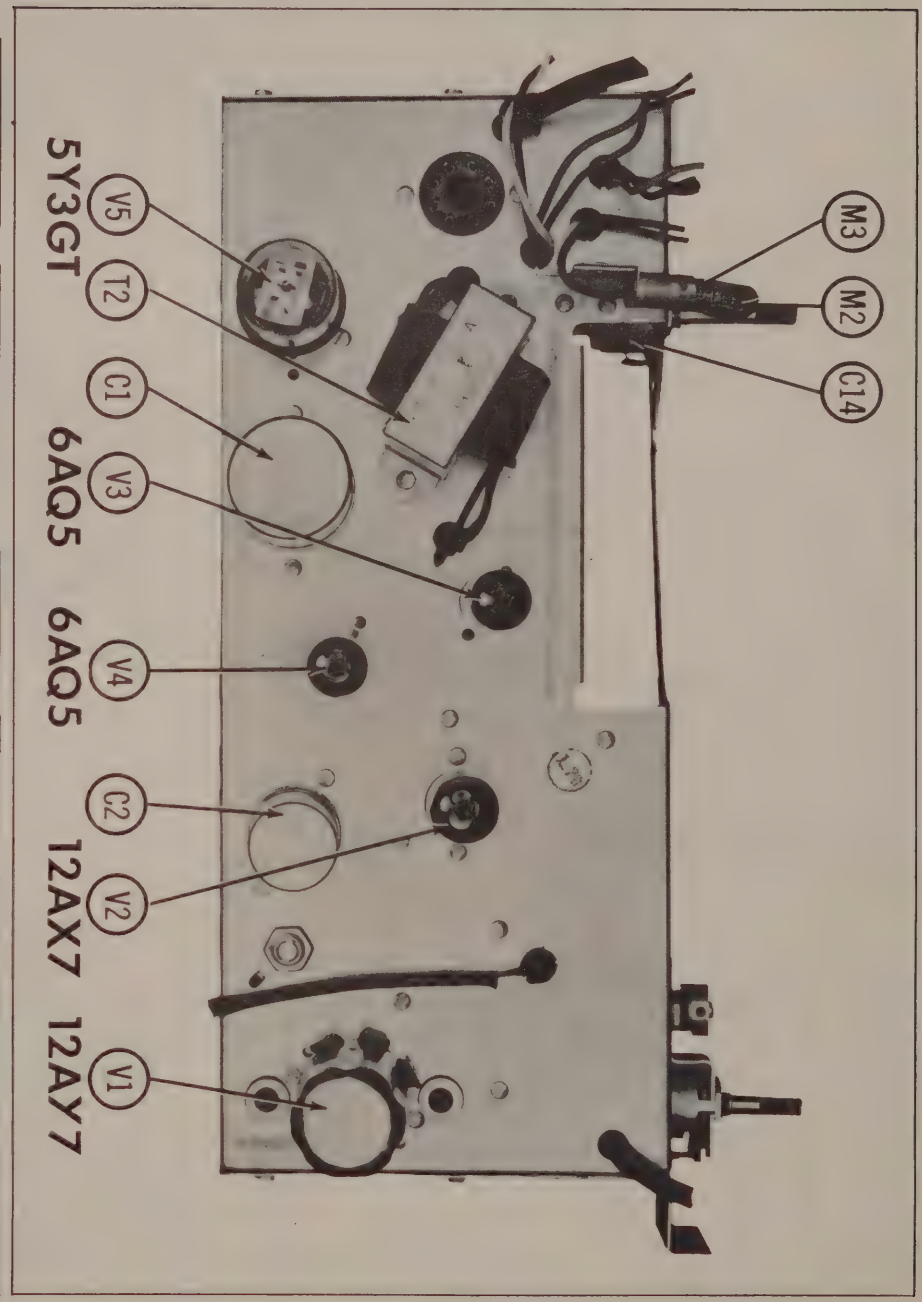
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	1500		75610	SI1500	D6-152	TP54	GP2L-152	UC-5215	5GA-T15	
C4	1500		75610	SI1500	D6-152	TP54	GP2L-152	UC-5215	5GA-T15	
C5	05	400	73558	BPD-05	DF-503	CUB4S5		PT415	4TM-S5	
C6	1000		54677	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C7	470		94223	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C8	035	600	73596							
C9	10000		206537	SI10000	D6-103	TP67	GP3-333-103	DC-511	5HK-S1	
C10	10000		206537	SI10000	D6-103	TP67	GP3-333-103	DC-511	5HK-S1	
C11	5000		98068	BPD-005	DD-503	K080	811-005	DC-525	5HK-D5	
C12	470		94223	SI470	D6-471	TP46	GP2K-471	UC-5347	5GA-T47	
C13	1000		54677	SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C14	100		75437	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C15	100		75437	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C16	05	200	73558	BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C17	01	400	73561	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C18	100		75437	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C19	1500		75610	SI1500	D6-152	TP54	GP2L-152	UC-5215	5HK-D15	
C20	220		77460	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C21	05	600	73553	BPD-05	DF-503	CUB6S5		PT615	6TM-S5	
C22	05	600	73553	BPD-05	DF-503	CUB6S5		PT615	6TM-S5	
C23	035	600	73596							
C24	1000	500	39652	1464-001		1R5D1	811-102	MCB255	MS-21	
C25	1500	1500	207034	HVD-15-1500	DD30-152	V2D15	1R5KV-152	DC30215		
C26	1500	1500	207034	HVD-15-1500	DD30-152	V2D15	1R5KV-152	DC30215		
C27	220		77460	SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C28	20		98233	NP0-SI20	TCZ-20	TZ13	NP0K-200	ZT-542	5TCC-Q2	
C29A	4000		74009	BPD-2X004	D6-402	DK078	822-004	DCD-524	5HK-2D4	
B	4000									

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1 Meg	1/2	98791	ABT-74	A47F5-1Meg	Q19-137X	UT-443	Volume Tapped @ 500KΩ
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach To R1A
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach To R1A
R2A	250KΩ	1/2	98792	B-51	A47-250K-Z	Q13-130	U-44	Tone
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach To R2A
R3A	500Ω	1/2	207036	AB-4	A47-500-S	Q11-103	U-2	Hum
B	Shaft		Not Req.	AK-1	FKS-1/4	RQ	Not Req.	Attach To R3A

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R4	680KΩ	1/2	30562	BTS-680K	
R5	4.7Meg	1/2	502547	BTS-4.7Meg	
R6	220KΩ	1/2	502422	BTS-220K	
R7	39KΩ	2	522339	BTB-39K	
R8	330KΩ	1/2	502433	BTS-330K	
R9	1.5Meg	1/2	502515	BTS-1.5Meg	
R10	22KΩ	1	502322	BTA-22K	
R11	120KΩ	1	512412	BTA-120K	
R12	10KΩ	1/2	502310	BTS-10K	
R13	68KΩ	1/2	502368	BTS-68K	
R14	470KΩ	1/2	502447	BTS-470K	
R15	4.7Meg	1/2	502547	BTS-4.7Meg	
R16	220KΩ	1/2	502422	BTS-220K	
R17	15KΩ	1	512315	BTA-15K	
R18	2.2Meg	1/2	502522	BTS-2.2Meg	
R19	47KΩ	1/2	502347	BTS-47K	
R20	120KΩ	1	512412	BTA-120K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R21	4700Ω	1/2	502247	BTS-4700	
R22	120KΩ	1	512412	BTA-120K	
R23	220KΩ	1/2	502422	BTS-220K	
R24	220KΩ	1/2	502422	BTS-220K	
R25	270Ω	2	39505	BTB-270	
R26	330KΩ	1/2	502433	BTS-330K	
R27	330KΩ	1/2	502433	BTS-330K	
R28	470KΩ	1/2	502447	BTS-470K	
R29	15KΩ	1	512315	BTA-15K	
R30	100KΩ	1/2	502410	BTS-100K	
R31	3.3Ω	7	207035	PW7-3	
R32	10Ω	1	512010	BTA-10	
R33	33Ω	2	522033		
R34	220Ω	2	522122	BTB-220	
R35	1000Ω	1	512210	BTA-1000	
R36	1000Ω	1/2	502210	BTS-1000	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @1.05A	580VCT @077A	5V @2A	6.3V @1.76A	206993	P9312			22R02	R-12A

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	5.4KΩ	8Ω	208067 206994①						①Used In Early Versions

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	RCA Victor PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Bias Oscillator	53Ω		206992				Tapped @15Ω
L2	Peaking Coil	50Ω		100490				7.4Millihenries

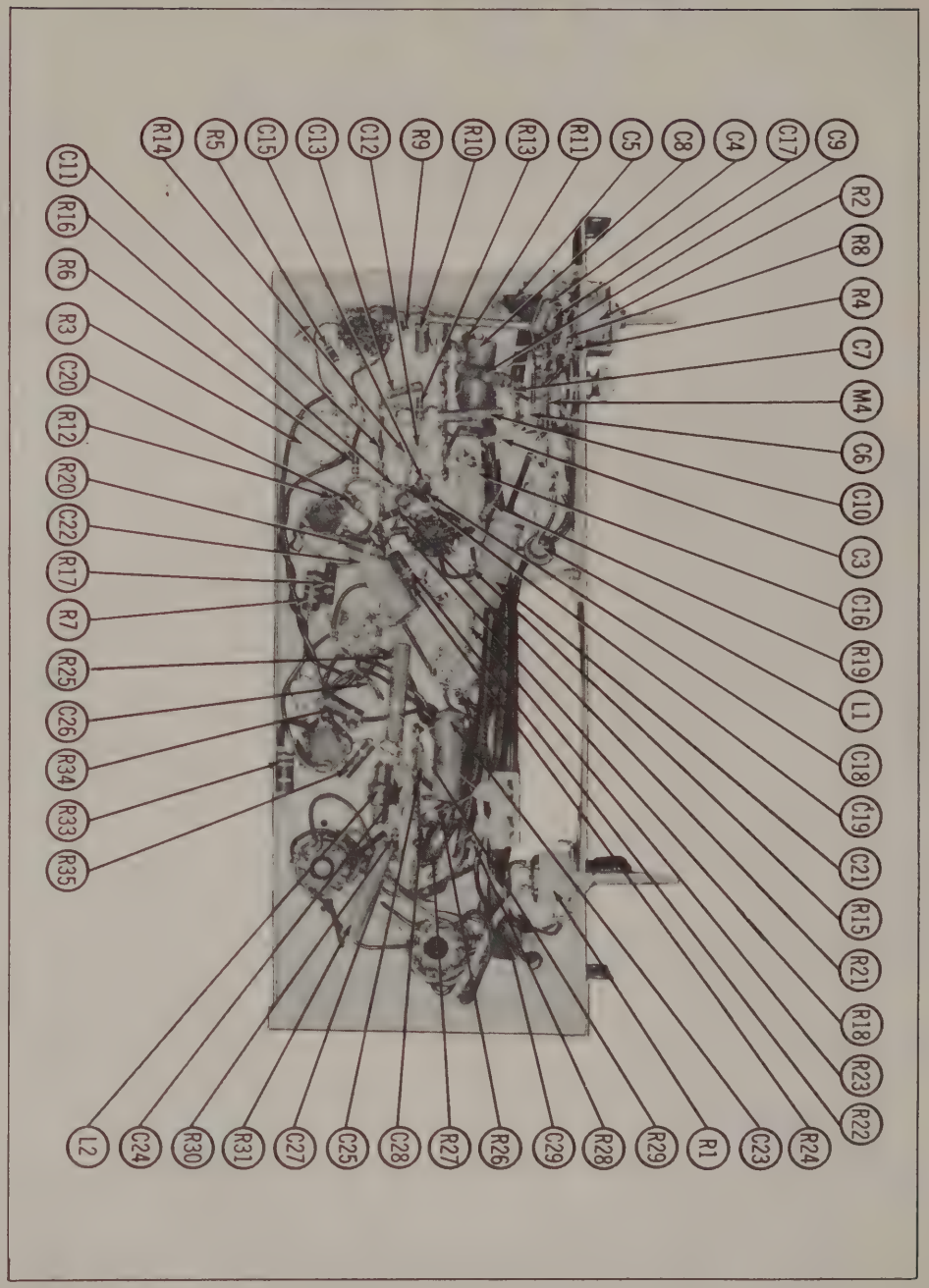
SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	RCA Victor PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5 1/4"	PM	8Ω	206347	52A1Z8		
SP2	5 1/4"	PM	8Ω	206347	52A1Z8		
SP3	4"	PM	8Ω	206348	4A07Z8		

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M1	Pilot Light	11891	#44
M2	Neon Indicator	91749	#NE51
M3	Neon Indicator	91749	#NE51
M4	Switch	98790	Play-Record (Rotary-Wafer Type)
M5	Switch	207037	On-Off (DPDT-Slide Type)
M6A	Switch	206692	Remote Control (Rotary-Wafer Type)
B	Switch		On-Off (SPST)
M7	Trimmer Capacitor	207033	Bias Adjustment (3-35MMF)
M8	Trimmer Capacitor	207033	Oscillator Coil Trimmer (850-1150MMF)
M9	Trimmer Capacitor	71807	Dual (10-160MMF each) Normal & Overload Record Level Adjustment
	Knob	206888	Speed Shift
	Knob	206884	Control (2 Used)
	Handle	206892	Includes Posts

CHASSIS—BOTTOM VIEW



MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	206888	Speed Shift Knob Gray
2	203769	Washer Control Knob Felt
3		#6-32 x 3/16" B. H. Screw
4		#6 Internal Lockwasher
5	206887	Take-up Reel Shaft & Holder, With Pulley, Gray
6	205866	Washer
7	206884	Control Knob Gray
8	206887	Feed Reel Shaft & Holder, Gray
9	206885	Record Lock Button
10		#6-32 x 1/2 O. H. Phil. Hd. Screw
11		#6-32 x 1" O. H. Phil. Hd. Screw
12	206882	Rear Escutcheon, Gray
13	206883	Front Escutcheon, Gray
14		#6-32 x 7/16 R. H. Screw
15		#6 Internal Lockwasher
16	98802	Button Retainer Bracket
17	76220	"E" Ring
18		Keps 6-32 x 3/8" Hex. Nut & Ext. Lockwasher
19	206886	Base Plate Assembly, Gray Hammertex
20	204213	Flywheel, Capstan
21	206698	Take-Up Reel Drive Belt, Spring
22		#6-32 x 1/2" B. H.
23		#6 Lockwasher
24	203703	Button Lever Assembly
25	206894	Push Button Gray
26	98818	Button Return Spring
27	204626	Button Hinge Bracket
28	98819	Button Lock Plate Spring
29	204627	Button Locking Plate
30		Washer
31		Internal Lockwasher
32		#6-32 x 1/4", Phil. Hd. Screw
33	206719	#6-32 x 3/16", Bristol Hd. Set Screw
34	206700	Tape Guide Left
35		Hex Nut
36	203696	Left Tape Guide Spacer
37	203695	Erase Head Plate
38	98816	Erase Head Tension Spring
39	98817	Record Actuating Lever
40		Felt Pad
41		Spring Adj. Screw
42	98808	Record Head
43		#2-56 Nut
44	98845	Erase Head
45		Flat Washer
46	98815	Record Slide Plate
47	203697	Playback Slide Lever
48	98812	Pressure Roller Spring
49	98814	Pressure Pad Spring Assembly
50	74788	Push-On Nut
51	98813	Playback Slide Plate Assembly
52	206719	#6-32 x 3/6 Bristol Hd. Set Screw
53	206701	Tape Guide Right
54	76744	Hair Pin Clip
55	98809	Linen Washer
56	206695	Pressure Roller
57	98809	Linen Washer
58	206694	Pressure Roller Plate
59	206696	Record Interlock Spring
60	98825	Switch Arm Link
61	203699	Switch Lever
62	98821	Brake Slide Plate Assembly
63	74788	Push-On Nut
64	98822	Idler Tension Spring
65	98823	High Speed Shift Plate
66	98820	Brake Return Spring
67	206690	Brake & Slide Plate Assy.
68		Brake Pad
69	206691	Idler Lever Assembly
70	98853	8-32 Shoulder Screw
71	98830	Idler Drive Belt Rubber
72	98829	Idler Drive Pulley
73		Washer
74	205867	Washer
75		"C" Washer
76	206720	Counter
77	206874	Counter Drive Belt
78		Counter Bracket
79		Counter Mounting Screws
80	7903	Input Jack
81	206723	Brake Drum Shaft
82		Drive Mounting Plate
83		#8 Lockwasher
84		#8-32 x 1/4"B. H. Screw
85	205866	Washer
86	206721	Brake Drum Assembly, With Pulley
87	26619	Brake Drum Set Screw
88	206703	Drive Mounting Plate Assy.
89		#8 External Lockwasher
90		#8-32 x 1/4"R. H. Screw
91	98836	Drive Motor
92	98837	"E" Ring
93		Flat Washer
94	203769	Felt Washer
95	98838	Fan
96	203769	Felt Washer
97	98839	Fan Fastener
98		Screw
99	98826	Sub Idler Plate Assy.
100		#8-32 x 5/16"B. H. Screw
101	98809	Linen Washer
102	98827	Sub Idler Wheel
103	205867	Washer
104	205867	Washer
105	76744	Hair Pin Clip
106	206727	Speed Control Shaft
107	98840	Grommet
108	206705	Motor Plate
109		Hex Nut
110	7903	Input Jack
111	98809	Linen Washer
112	204213	Flywheel
113	206689	Brake Drum Shaft
114		Allen Set Screw
115	205866	Laminated Washer
116	206688	Brake Drum Assembly
117	26619	Brake Drum Set Screw
118		Angle Mounting Bracket
119		#8 Ext. Lockwasher
120		#8-32 x 3/8" B. H.
121		#8 Internal Lockwasher
122		#8-32 x 3/8"R. H. Screw
123	206709	Speed Shift Lever
124		Screw
125	98847	"C" Washer
126	206135	Idler Slide Plate Bushing
127	206704	Idler Slide Plate
128	76744	Hair Pin Clip
129	98809	Linen Washer
130		Washer
131	98834	Idler Wheel
132	98809	Linen Washer
133	98842	Idler Tension Springs
134		Screw
135		Speed Control Shaft Detent
136	26619	Motor Pulley Set Screw
137	98843	Idler Lift Compression Spring
138		#8-32 x 1/4"R. H. Screw
139		#8 Internal Lockwasher
140		#8 Flat Washer
141	203702	Idler Throw-out Lever
142	206051	Motor Pulley

PHOTOFACT* Folder

RAYTHEON
MODEL C2175B, M (Ch. 21T38)

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RAYTHEON MODEL C-2175M

TRADE NAME	Raytheon Models C-2175B, C-2175M (Ch. 21T38)
MANUFACTURER	Raytheon Manufacturing Co., Television & Radio Division, 5921 W. Dickens Ave., Chicago 39, Illinois
TYPE SET	Television Receiver
TUBES	Fifteen
POWER SUPPLY	105-115 Volts AC-60 Cycle RATING 1.34 Amp. @ 115 Volts AC
TUNING RANGE-	Channels 2 thru 13, Video IF 26.75MC, Sound IF 22.25MC (Intercarrier)

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Tube Placement Chart (Top View) 5

RAYTHEON
MODEL C2175B, M (Ch. 21T38)

PROPERTY OF
L. F. ANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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DATE 4-56 SET 313 FOLDER 10

PROPERTY OF
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3611 ARAPAHOE ST.
DENVER, COLORADO

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.
2. Remove 13 metal screws. Remove rear cover.
3. Remove 4 wood screws holding front grill trim.
4. Remove grill trim and remove 2 chassis bolts now accessible.
5. Remove picture tube socket, speaker leads, yoke plugs and HV lead.
6. Remove 4 metal screws, 2 holding normal-fringe control, and 2 holding interlock-antenna bracket.
7. Remove 2 metal screws holding chassis to side of cabinet.
8. Remove chassis.
9. Remove 4 wood screws. Remove speaker.

MODELS	CHASSIS
C-2175B, C-2175M	21T38

RAYTHEON
MODEL C2175B, M (Ch. 21T38)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner Oscillator Circuit may be accomplished by removal of the Channel Selector and Fine Tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the left of the Channel Selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 4 wood screws holding strip at the top edge of the safety glass. Remove strip and safety glass. Use extreme caution when removing safety glass.

SERVICE ADJUSTMENT LOCATION

See Tube Placement Chart on Page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to the set. Adjustment is located on tube side of chassis. Set the horizontal hold control to the center of its range and adjust the horizontal oscillator slug (L21) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the buzz control (R8) located on top of the chassis for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered .

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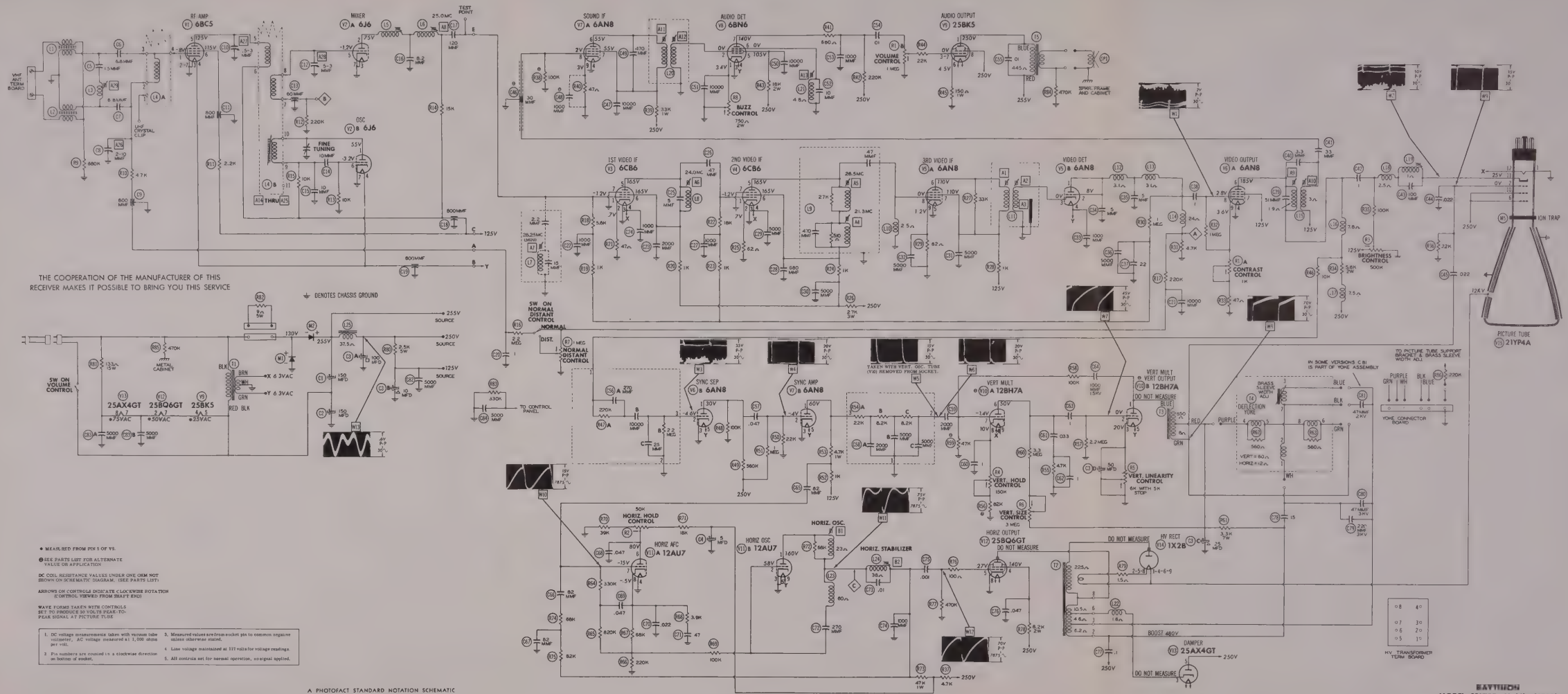
RF AMP V1 6BC5
MIXER V7 A 6J6
OSC V2 B 6J6
SOUND IF V7 A 6AN8
AUDIO DET V8 6BN6
AUDIO OUTPUT V9 25BK5
1ST VIDEO IF V3 6CB6
2ND VIDEO IF V4 6CB6
3RD VIDEO IF V5 A 6AN8
VIDEO DET V5 B 6AN8
VIDEO OUTPUT V6 A 6AN8
SYNC SEP V6 B 6AN8
SYNC AMP V7 B 6AN8
VERT MULT V10 A 12BH7A
VERT MULT & VERT OUTPUT V10 B 12BH7A
HORIZ OSC V11 B 12AU7
HORIZ AFC V11 A 12AU7
HORIZ OUTPUT V12 25BQ6GT
HV RECT V14 1X2B
DAMPER V13 25AX4GT
PICTURE TUBE V15 21YP4A
25AX4GT 25BQ6GT 25BK5
SW ON VOLUME CONTROL
SW ON NORMAL DISTANT CONTROL
VOLUME CONTROL
BUZZ CONTROL
CONTRAST CONTROL
BRIGHTNESS CONTROL
VERT. HOLD CONTROL
VERT. SIZE CONTROL
VERT. LINEARITY CONTROL
HORIZ. HOLD CONTROL
HORIZ. STABILIZER
DEFLECTION YOKE
ION TRAP
BOOST 480V
DO NOT MEASURE
TEST POINT
SPKR. FRAME AND CABINET
HV TRANSFORMER TERM BOARD
YOKE CONNECTOR BOARD
TO PICTURE TUBE SUPPORT BRACKET & BRASS SLEEVE WIDTH ADJ.
IN SOME VERSIONS C.B. IS PART OF YOKE ASSEMBLY
TAKEN WITH VERT. OSC. TUBE (V10) REMOVED FROM SOCKET
TO CONTROL PANEL
DENOTES CHASSIS GROUND

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

● MEASURED FROM PIN 5 OF V9.

◐ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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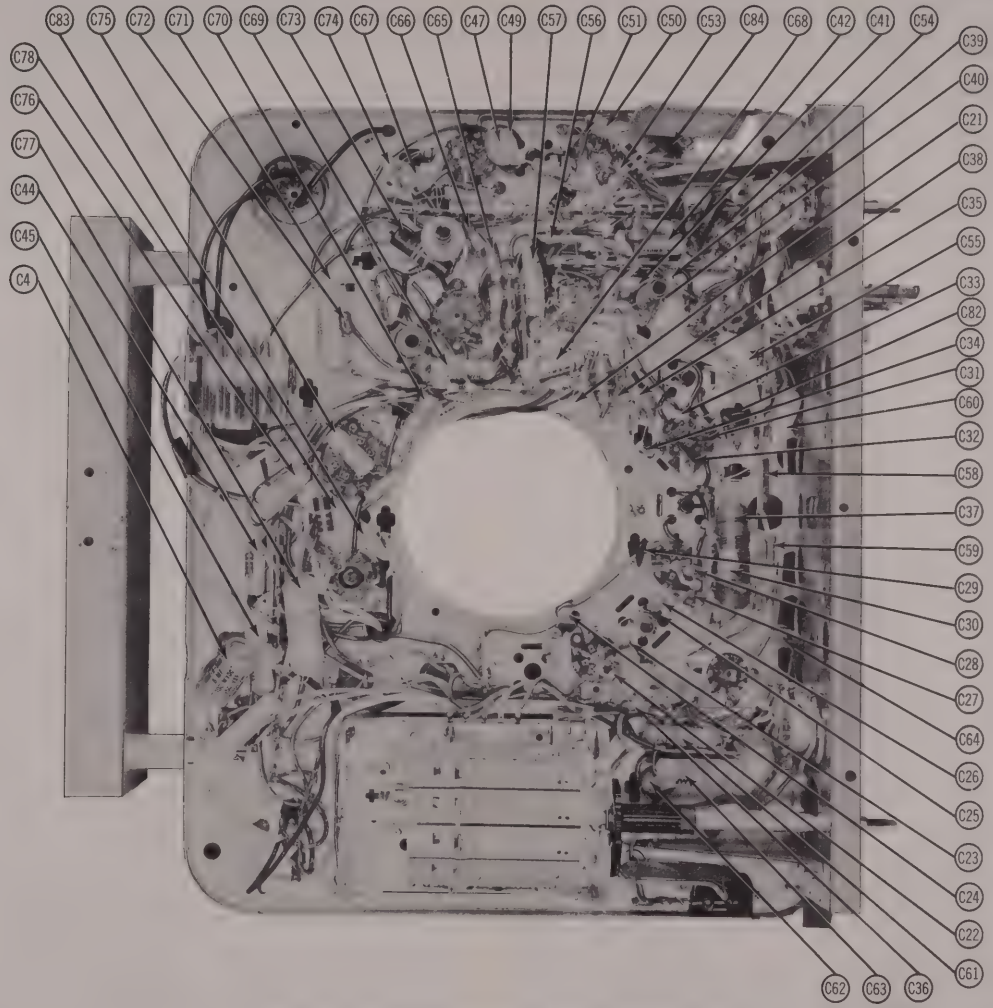
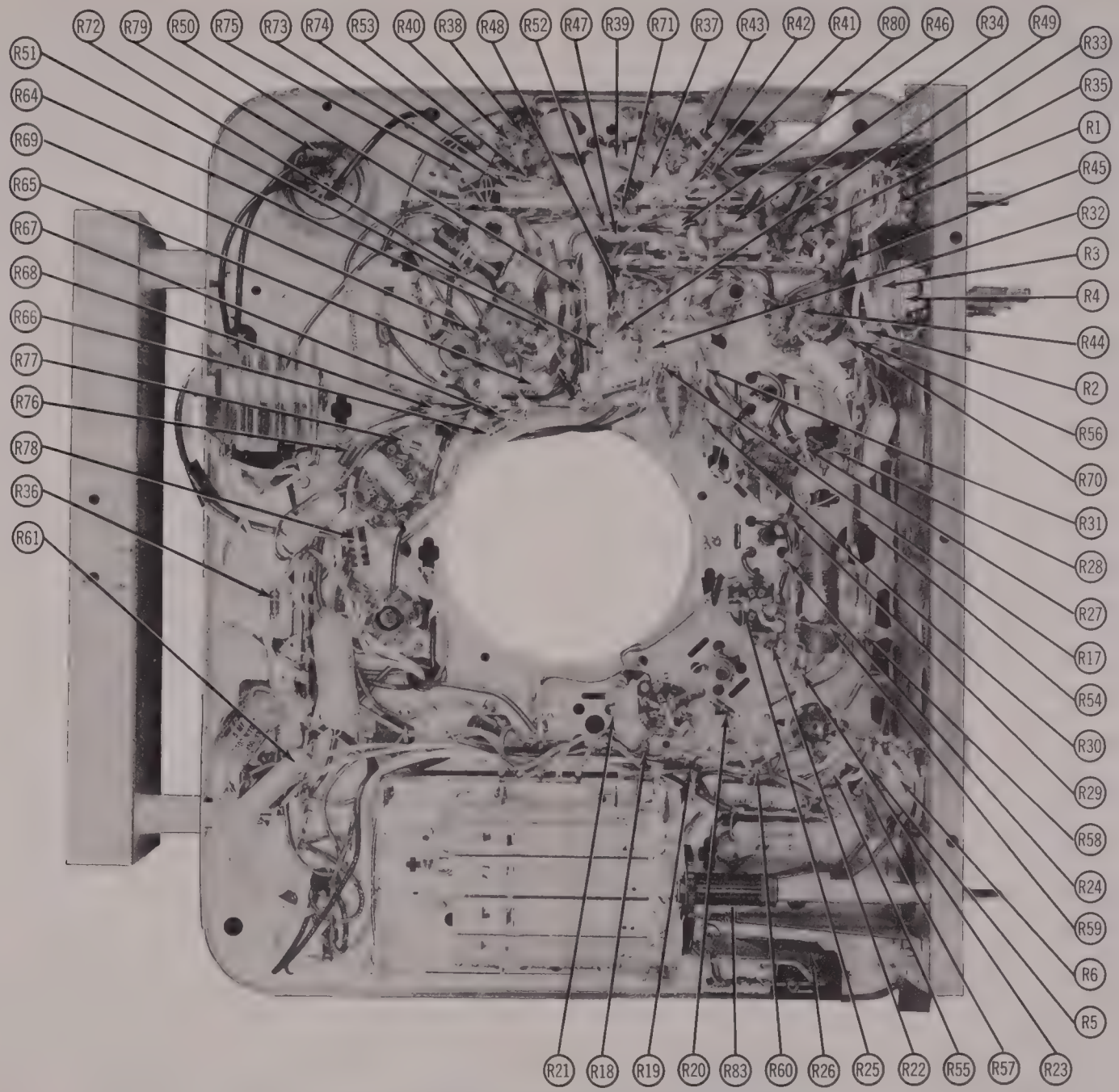
RAYTHEON MODEL C2175B, M (Ch. 21T38)

RAYTHEON
MODEL C2175B, M (Ch. 21T38)

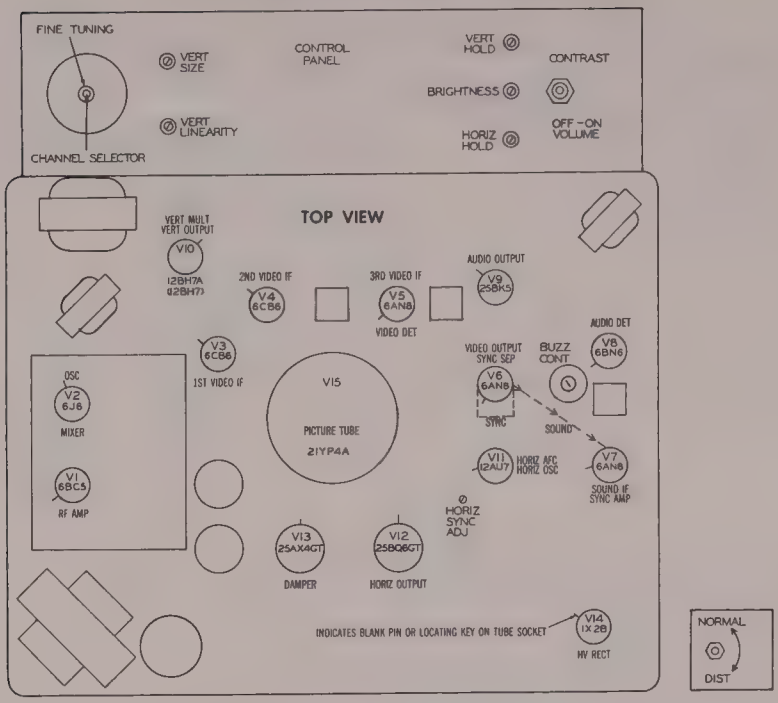


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

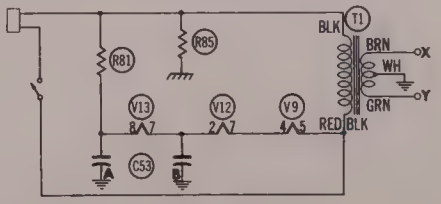
POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V15
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V7, V10
No horiz. sync - V7, V11
No vert. or horiz. sync - V6, V7

SWEEP FAILURE
No raster, has sound - V11, V12, V13, V14, V15
No vertical deflection - V10
Poor vert. linearity or foldover - V10
Poor horiz. linearity or foldover - V11, V12, V13
Narrow picture - V11, V12, V13, V14, M1, M2
Vert. off freq. - V7, V10
Horiz. off freq. -V7, V11

Note: Since this receiver employs tubes used in a series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See Circuit below).



SET 313 FOLDER 10

RAYTHEON
MODEL C2175B, M (Ch. 21T38)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped away from the chassis. Do not remove the horizontal oscillator tube (V11) to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 8 (grid) of 6AN8 (V5). Low side to chassis.	25MC (10MC Swp.)	23. 9MC 26. 3MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A1, A2, A3	Connect a short jumper from pin 5 (plate) to pin 6 (screen) of 6CB6 (V4). Adjust for response similar to Fig. 1 with markers at 90%. A3 is a coupling rod and affects band width. Remove short from pin 5 to pin 6 of V4.
2.	Direct	High side to an ungrounded tube shield floating over converter tube. Low side to chassis.	Not Used	21. 3MC Unmod.	"	Use VTVM DC probe to point (A). Common to chassis.	A4	Adjust for maximum deflection.
3.	"	"	"	26. 5MC	"	"	A5	Adjust for maximum deflection. Repeat Step 2.
4.	"	"	"	24MC	"	"	A6	Adjust for maximum deflection. Attenuate generator output to maintain not more than 2 volts at VTVM.
5.	"	"	"	28. 25MC	"	"	A7	Adjust for MINIMUM deflection.
6.	"	"	"	25. 0MC	"	"	A8	Adjust for maximum deflection. Attenuate generator to maintain not more than 2 volts at VTVM.
7.	"	"	25MC (10MC Swp.)	21. 3MC 23. 8MC 26. 65MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response similar to Fig. 2. Rock A8 for flat response. Increase sweep generator output and use high scope gain to view 22. 25MC trap region. Adjust A4 so that 21. 3MC appears at peak of pop-up portion preceeding trap notch. 22. 25MC should fall in trap notch. If response is not similar to Fig. 2 , repeat steps 1 thru 7.

SOUND IF ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket. Tune in a TV signal and adjust the fine tuning control until sound bars just appear in the picture. Adjust A9 fully counter clockwise, and then clockwise until the horizontal scanning lines are smooth and continuous. Readjust the fine tuning control for clearest picture and best sound. Insert an attenuator in series with the antenna and the receiver antenna terminals so that signal strength may be varied from weak to strong. If a suitable attenuator is not available stray feed the signal to the set by placing the antenna lead-in near the antenna terminals of the receiver.
Reduce the signal input to the receiver so that the signal falls below the limiting level of the 6BN6 limiter-detector as evidenced by a "hiss" in the sound. Adjust the secondary of the sound take-off transformer (A10), the sound if transformer (A11 and A12), the quadrature coil (A13) and the buzz control (R8) for maximum sound and minimum buzz. If hiss disappears during adjustments, increase attenuation until hiss reappears.

OSCILLATOR ALIGNMENT

The channel oscillator adjustment screws are reached through a hole just to the left of the fine tuning shaft. The correct oscillator adjustment screw is accessible through this hole as the channel switch is turned to each channel. Connect the negative lead of a 1. 5 volt bias battery to the ungrounded side of C37. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp.)	193. 25MC 197. 75MC	10	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 3. Use high scope gain and increase sweep generator output to view trap region. Video marker should fall at 50% on response curve.
			213MC (10MC Swp.)	211. 25MC 215. 75MC	13		A15	
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12		A16	
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11		A17	
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9		A18	
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8		A19	
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7		A20	
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6		A21	
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5		A22	
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4		A23	
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3		A24	
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2		A25	

ALIGNMENT INSTRUCTIONS (cont)

RF AND MIXER ALIGNMENT

Leave bias battery connected as under "Oscillator Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp.)	193. 25MC 197. 75MC	10	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A26, A27, A28	Adjust for response curve similar to Fig. 4 with markers above 90%.
10.	"	"	69MC (10MC Swp.)	67. 25MC 71. 75MC	4	"		Check for response curve similar to Fig. 4. If markers fall below 70% on any channel, make slight compromise adjustments of A26, A27, and A28 with channel switch set at that channel. Recheck all other channels to make sure they have not been seriously affected.
			213MC (10MC Swp.)	211. 25MC 215. 75MC	13			
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12			
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11			
			189MC (10MC Swp.)	193. 25MC 197. 75MC	9			
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp.)	175. 25MC 181. 75MC	7			
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5			
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2			
11.	"	"	Not Used	105MC	2	Use VTVM DC probe to point (A). Common to chassis.	A29	Adjust for MINIMUM deflection.

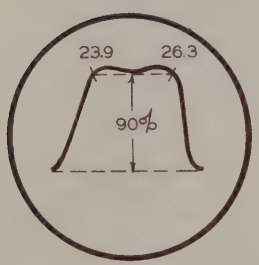


FIG.1

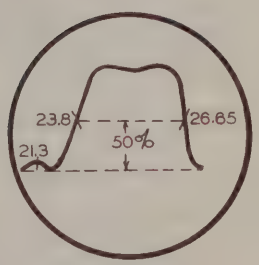


FIG.2

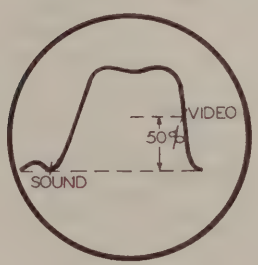


FIG.3

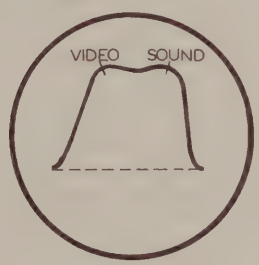
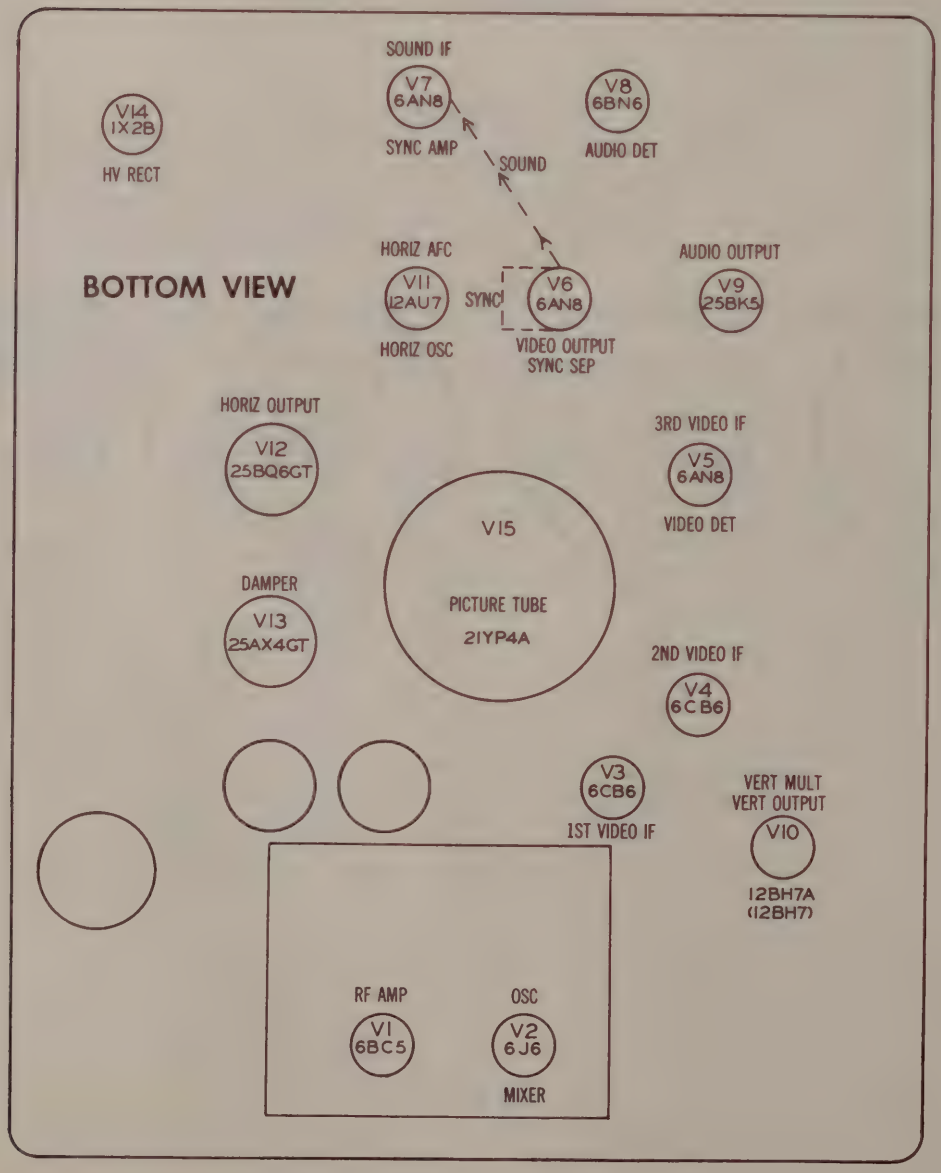


FIG.4

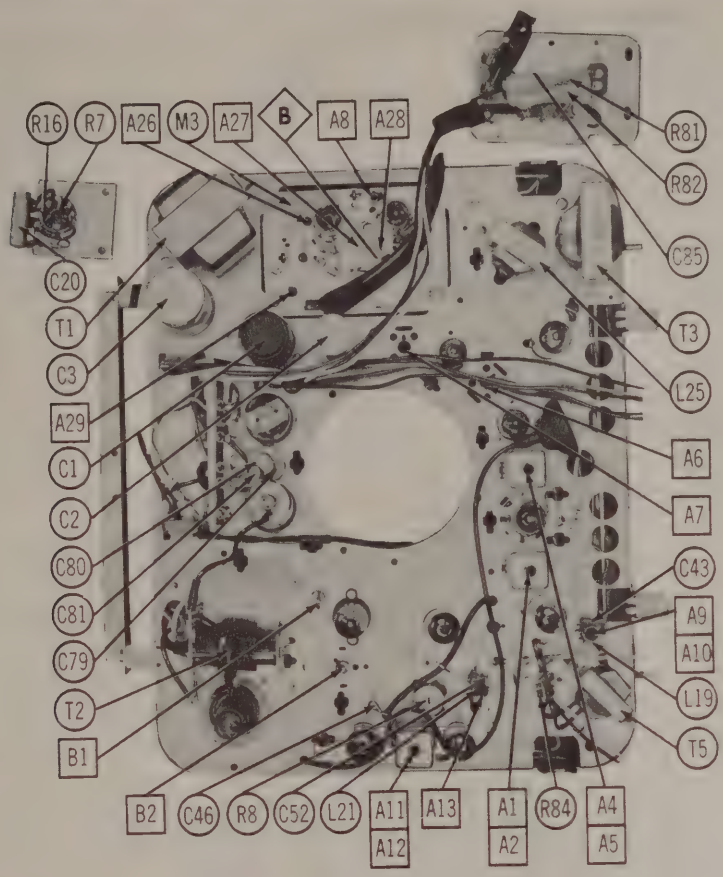
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	2. 5Meg	0Ω	0Ω	. 1Ω	† 2. 5KΩ	† 4. 7KΩ	0Ω		
V 2	6J6	† 13KΩ	† 18KΩ	0Ω	. 1Ω	220KΩ	10KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	0Ω	. 1Ω	† 3. 7KΩ	† 3. 7KΩ	0Ω		
V 4	6CB6	1Meg	62Ω	0Ω	. 1Ω	† 3. 7KΩ	† 3. 7KΩ	0Ω		
V 5	6AN8	4. 7KΩ	4. 7KΩ	. 2Ω	. 1Ω	0Ω	† 3. 5KΩ	† 3. 5KΩ	2. 5Ω	82Ω
V 6	6AN8	† 120KΩ	2. 2Meg	0Ω	0Ω	. 1Ω	† 5. 6KΩ	† 2. 5KΩ	1Meg	170Ω
V 7	6AN8	† 8. 2KΩ	22KΩ	0Ω	0Ω	. 1Ω	† 33KΩ	† 33KΩ	100KΩ	47Ω
V 8	6BN6	400Ω	. 3Ω	0Ω	. 1Ω	† 18KΩ	4. 8Ω	† 220KΩ		
V 9	25BK5	†445Ω	TP	130KΩ	♦ 10Ω	♦ 0Ω	150Ω	130KΩ	† 38Ω	TP
V 10	12BH7A	▪ 4KΩ	2. 2Meg	1. 3KΩ	. 1Ω	. 1Ω	▪ 4. 5Meg	47KΩ	80KΩ	1. 6Ω
V 11	12AU7	† 50KΩ	300KΩ	0Ω	0Ω	0Ω	† 22KΩ	1. 5Meg	300KΩ	. 1Ω
V 12	25BQ6GT	TP	♦ 20Ω	TP	† 8. 2KΩ	470KΩ	TP	♦10Ω	0Ω	TOP CAP ▪ 12Ω
V 13	25AX4GT	TP	NC	250KΩ	NC	† 38Ω	TP	♦ 20Ω	♦ 25Ω	
V 14	1X2B		PINS	1 - 9	HAVE	INF	RESISTANCE			TOP CAP ▪ 237Ω
V 15	21YP4A	0Ω	22KΩ	PIN 6 † 38Ω	PIN 10 † 38Ω	PIN 11 † 170KΩ	PIN 12 . 1Ω			

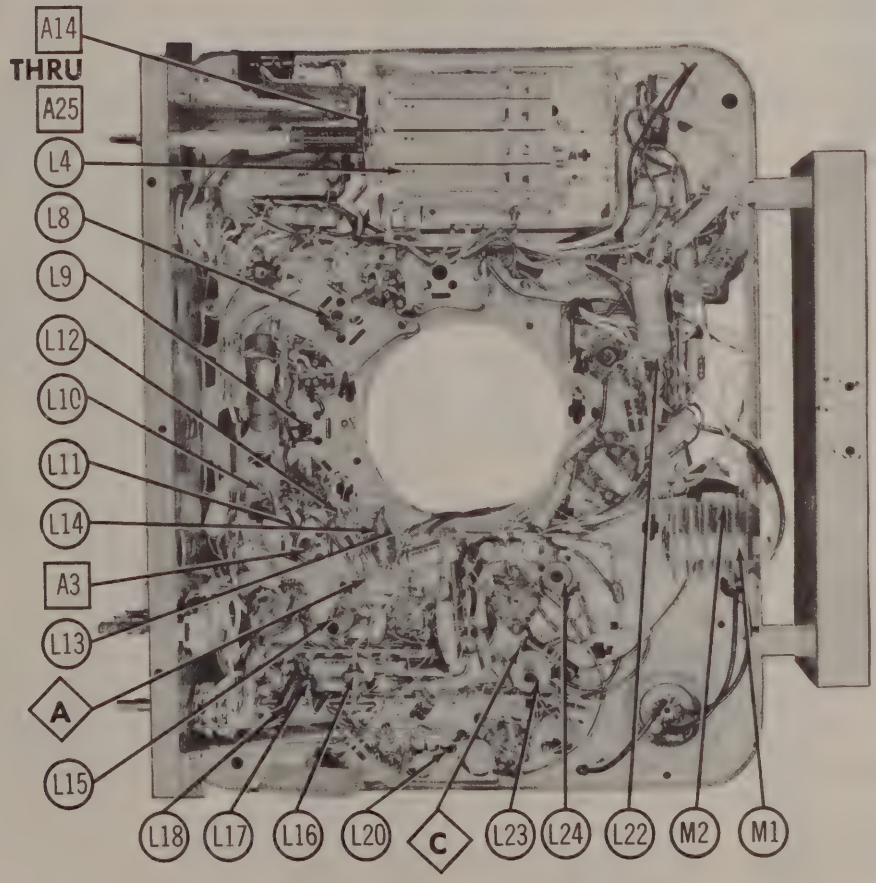
♦ MEASURED FROM PIN 5 OF V9.
† MEASURED FROM OUTPUT OF M2.
▪ MEASURED FROM PIN 3 OF V13.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BC5	6BC5	
V2	Mixer-Oscillator	6J6	6J6	
V3	1st. Vdieo IF Amplifier	6CB6	6CB6	
V4	2nd. Video IF Amplifier	6CB6	6CB6	
V5	3rd. Video IF Amplifier-Video Detector	6AN8	6AN8	
V6	Video Output-Sync Separator	6AN8	6AN8	
V7	Sound IF Amplifier-Sync Amplifier	6AN8	6AN8	
V8	Audio Detector	6BN6	6BN6	
V9	Audio Output	25BK5	25BK5	
V10	Vert. Mult.-Vert. Output	12BH7A	12BH7A	12BH7 may be used as an alternate
V11	Horiz. AFC- Horiz. Osc.	12AU7	12AU7	
V12	Horiz. Output	25BQ6GT	25BQ6GT	
V13	Damper	25AX4GT	25AX4GT	
V14	HV Rectifier	1X2B	1X2B	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: CBS PART No.	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA: SYLVANIA PART No.	NOTES
V15	21YP4A①	21YP4A ① 21YP4	21YP4A ① 21YP4	21YP4A ② 21YP4	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	RAYTHEON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	150	150	8C-22463	AFHS1-70	XA004	FP117	TM-150-150	T-050	TVL-1428
C2	150	150	8C-22464	AFHS1-70	XA004	FP117	TM-150-150	T-050	TVL-1428
C3A	▪100	300	8C-25309	RE101D		FP389.1	TM-4128	T-537	R1654
B	▲10	300				TC39		MT-4530	
C	▲25	450							
D	50	50							
C4	5	300	8C-24174		BR435	TC60	TD-8-350	FM-3508	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	1.5		13L8C1R5C	NPO-S11.5	TCZ-1R5	Z004	NP0A-1R5	ZT-5515	5TCCB-V15	
C6	6.8		13L8C6R81	NPO-D16.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C7	6.8		13L8C6R81	NPO-D16.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C8	2-10		31B-901		829-10					
C9	800		13M-320EA-102ZC							
C10	.5-3		31B-90Z		829-3		3115-01-0R5	CT565A		
C11	800		13M-320EA-102ZC							
C12	.5-3		31B-902		829-3		3115-01-0R5	CT565A		
C13	60		13M-320Q-600J							
C14	10		13L8Q100A							
C15	10		13L8UA100D							
C16	8.2		13L8C8R2D	NP0-D18.2		Z016	NP0A-8R2			
C17	120		13L8V121K	BPD-00012	DD-121	G044	811-121	UC-5312	5GA-T12	
C18	800		13M-320EA-102ZC							
C19	800		13M-320EA-102ZC							
C20	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C21	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C22	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	2000			SI2000	DD-202	TP56	861-001	UC-522	5HK-D2	
C24	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C25	5			NP0-D15	TCZ-4R7	Z011	NP0A-050	ZT-555	5TCCB-V47	
C26	47			BPD-000047	D6-470	G033	GP1K-470	UC-5447	5GA-Q47	
C27	1000			SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	
C28	680			SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C29	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C30	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C31	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C32	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C33	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C34	5			NP0-S15	TCZ-4R7	Z011	NP0A-050	ZT-555	5TCCB-V47	
C35	5			NP0-S15	TCZ-4R7	Z011	NP0A-050	ZT-555	5TCCB-V47	
C36	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C37	.22	200		P288N-22		CUB2P22		PT4022	2TM-P22	
C38	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C39	51									
C40	3.3			NP0-SI3.3	TCZ-3R3	Z008	NP0A-3R3	ZT-5533	5TCCB-V33	
C41	33			NP0-SI33	TCZ-33	TZ18	NP0L-330	ZT-5433	5TCC-Q33	
C42	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C43	100	500		NP0-SI100	D6-101	22R5T1	801-101	MCB235	MS-31	
C44	.022	200		BPD-02	DD-203	CUB4S22	817-02	PT4122	2TM-S22	
C45	.022	600		BPD-02	DD-203	CUB6S22	817-02	PT6122	6TM-S22	
C46	30		14B-23772							Note 1
C47	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C48	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	Note 2
C49	470	500		1464-00047	D6-471	5R5T47	811-471	MCB245	MS-447	
C50	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C51	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C52	10			NP0-SI10	TCZ-10	TZ09	NP0K-100	ZT-541	5TCC-Q1	
C53	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C54	.01	400		BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C55	.01	600		BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C56A	270			SI270		TP41	GP2K-271	UC-5327	5GA-T27	
B	10000		†17A-24212	BPD-01	†PC-263	K082	811-01	DC-511	5HK-S1	
C	25			SI25		TP25	GP1K-250	UC-5425	5GA-Q25	
C57	.047	200		BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C58A	2000							DC-522		
B	5000		♦17A-22376	♦PA-110	♦PC-100	♦115TM1	♦1405-01	DC-525	♦V-1	
C	5000							DC-525		
C59	2000			SI2000	D6-202	TP56	GP2-333-202	UC-522	5GA-D2	
C60	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C61	.033	400		BPD-03	DF-303	CUB6S33		PT6133	4TM-S33	
C62	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C63	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

PARTS LIST AND

CAPA

ITEM No.	RATING: CAP.	RATING: VOLT	RAYTHEON PART No.	AEROVOX PART No.	CENTRA PART
C64	1000	1500		HVD-15-1000	DD30-1
C65	82	500		1469-00082	TCZ-8
C66	82	500		1469-00082	TCZ-8
C67	82	500		1469-00082	TCZ-8
C68	.047	400		BPD-05	DF-503
C69	.047	200		BPD-05	DF-503
C70	.022	200		BPD-02	DD-203
C71	.47	200		P288N-47	
C72	270			NP0-S1270	TCZ-2
C73	.01	600			
C74	1000	500		1464-001	
C75	.001	600		BPD-001	D6-102
C76	.047	400		BPD-05	DF-503
C77	.1	600		P688N-1	DF-104
C78	.15	200		P288N-15	
C79	220	3000	8G-23953	HVD-30-221	DD30-2
C80	47	3000	8G-24026	HVD-30-47	DD30-4
C81	47	2000	8G-23645	HVD-30-47	DD30-4
C82	5000			BPD-005	DD-502
C83A	5000			BPD-2X005	DD3-50
B	5000				
C84	5000			BPD-005	DD-502

Note 1. C45 is the capacitance of the sound IF coupling shield
Note 2. Not used in some versions.
† Items C56A, C56B, C56C, R47A and R47B are combined in
♦ Items C58A, C58B, C58C, R54A, R54B and R54C are combi

CON

ITEM No.	RATING: RESIST-ANCE	RATING: WATTS	RAYTHEON PART No.	CENTRALAB PART No.	REPLACEMEN CLARO PART
R1A	1000Ω	½	10A-23714	F1-4	RTV-48
B	1Meg	½		R2-52	
C	Switch			KB-1	
R2A	50KΩ	½	10B-25297	AB-31	A47-50
B	Shaft		Not Req.	AK-4	KSS-3
R3A	500KΩ	½	10B-25295	AB-59	A47-500
B	Shaft		Not Req.	AK-4	KSS-3
R4A	150KΩ	½	10B-25296	AB-43	A47-150
B	Shaft		Not Req.	AK-4	KSS-3
R5A	6000Ω	½	10B-23407	AB-10 †	A47-500
B	Shaft		Not Req.	AK-1	FKS-½
R6A	3Meg	½	10B-23696	AB-84	A47-3M
B	Shaft		Not Req.	AK-1	FKS-½
R7A	1Meg	½	10A-25667	AB-69	A47-1Me
B	Shaft		Not Req.	AK-3	FS-3
C	Switch		Not Req.	KB-3	SWE-21
R8	750Ω	2	10D-23857		39-750

♦ Concentrikit Equivalent; K-6 Kit, Base Elements and Shaft

* Universal Replacement (Mallory Exact Duplicate Part No.
† Connect a 1000Ω resistor in series with the right hand term terminal of the original control (control viewed from shaft

RESIS

ITEM No.	RATING: OHMS	RATING: WATT	RAYTHEON PART No.	IRC PART No.	NOTES
R9	680KΩ	½		BTS-680K	
R10	4700Ω	½		BTS-4700	
R11	2200Ω	½		BTS-2200	
R12	220KΩ	½		BTS-220K	
R13	10KΩ	½		BTS-10K	
R14	15KΩ	½		BTS-15K	
R15	10KΩ	½		BTS-10K	
R16	2.2Meg	½		BTS-2.2Meg	
R17	220KΩ	½		BTS-220K	
R18	5600Ω	½			
R19	1000Ω	½		BTS-1000	
R20	1000Ω	½		BTS-1000	
R21	47Ω	½		BTS-47	
R22	18KΩ	½			
R23	1000Ω	½		BTS-1000	
R24	1000Ω	½		BTS-1000	
R25	62Ω 5%	½	9B1-130	BTS-62 5%	
R26	2700Ω	3	9C11-1104		
R27	33KΩ	½			
R28	1000Ω	½		BTS-1000	
R29	82Ω	½		BTS-82	
R30	1Meg	½		BTS-1Meg	
R31	4700Ω	½		BTS-4700	
R32	1Meg	½		BTS-1Meg	
R33	47Ω	½		BTS-47	
R34	5600Ω	2		BTB-5600	
R35	100KΩ	½		BTS-100K	
R36	22KΩ	½		BTS-22K	
R37	4700Ω	½		BTS-4700	
R38	100KΩ	½		BTS-100K	Note 1
R39	33KΩ	1		BTA-33K	
R40	47Ω	½		BTS-47	
R41	680Ω	½		BTS-680	
R42	220KΩ	½		BTS-220K	
R43	18KΩ	2		BTB-18K	
R44	22KΩ	½		BTS-22K	
R45	150Ω	1		BTA-150	
R46	10KΩ	½		BTS-10K	
R47A	220KΩ		†17A-24213	BTS-220K	
B	2.2Meg			BTS-2.2Meg	

Note 1. Some versions use a 470KΩ
Note 2. Some versions use a 68KΩ
Note 3. Some versions use a 100KΩ
† Items R47A, R47B, C56A, C56B
♦ Items R54A, R54B, R54C, C58A

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: RAYTHEON PART No.	STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	5BC5	6BC5	
V2	Mixer-Oscillator	6J6	6J6	
V3	1st. Video IF Amplifier	6CB6	6CB6	
V4	2nd. Video IF Amplifier	6CB6	6CB6	
V5	3rd. Video IF Amplifier-Video Detector	6AN8	6AN8	
V6	Video Output-Sync Separator	6AN8	6AN8	
V7	Sound IF Amplifier-Sync Amplifier	6AN8	6AN8	
V8	Audio Detector	6BN6	6BN6	
V9	Audio Output	25BK5	25BK5	
V10	Vert. Multi.-Vert. Output	12BH7A	12AU7	12BH7 may be used as an alternate
V11	Horiz. AFC- Horiz. Osc.	12AU7	12AU7	
V12	Horiz. Output	25BQ6GT	25BQ6GT	
V13	Damper	25AX4GT	25AX4GT	
V14	HV Rectifier	1X2B	1X2B	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: RAYTHEON PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V15	21YP4A①	21YP4A ①	21YP4 ①	21YP4A ② ③	① Aluminized ② Silver screen "B5"
	21YP4	21YP4	21YP4	21YP4 ③	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP	VOLT	REPLACEMENT DATA: RAYTHEON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	150	150	8C-12463	AFH81-70	XA004	FP17	TM-150-150	T-050	TVL-1428
C2	150	150	8C-12464	AFH81-70	XA004	FP17	TM-150-150	T-050	TVL-1438
C3A	⌀100	300	8C-25309	RH101G		FP399.1	TM-6138	ET-537	RM654
B	⌀10	300				FP399.1		MT-4530	
C	⌀25	450				FTC39			
D	50	50							
C4	5	300	8C-24174	BR435	TC50	TD-8-350	FM-3508		

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	1.5		13L8C185C	NPO-5I1.5	TCZ-1R5	2D05	NPOA-1R5	Z7-5515	5TCCB-V15	
C6	5.6		13L8C5R1	NPO-D15.6	TCZ-5R6	2D15	NPOA-5R6	Z7-5568	5TCCB-V56	
C7	5.6		13L8C5R1	NPO-D15.6	TCZ-5R6	2D15	NPOA-5R6	Z7-5568	5TCCB-V56	
C8	2-10		31B-001		839-10					
C9	800		13M-330EA-1032CC							
C10	.5-3		31B-902		839-3		31L5-01-0R5	CT565A		
C11	800		13M-320EA-1032CC							
C12	.5-3		31B-902		839-3		31L5-01-0R5	CT565A		
C13	80		13M-330Q-800J							
C14	10		13L8Q10OA							
C15	10		13L8UA10OD							
C16	8.2		13L8CR82D	NPO-D18.2		2D15	NPOA-5R2			
C17	130		13L8V131K	DD-0001	DD-121	G044	811-121	UC-5312	5GA-T12	
C18	800		13M-320EA-1032CC							
C19	800		13M-320EA-1032CC							
C20	.1	200		P388N-1	DF-104	CUB2P1		PT401	27M-P1	
C21	10000			BPD-01	DD-103	K063	811-01	DC-511	5HK-D1	
C22	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	2000			SID300	DD-302	TP56	801-002	UC-523	5HK-D2	
C24	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C25	5			NPO-D15	TCZ-4R7	Z011	NPOA-050	Z7-555	5TCCB-V47	
C26	47			BPD-00004T	DE-470	GP33	GPUE-470	UC-5447	5GA-Q47	
C27	1000			SID100	DE-102	TP52	GP31-102	UC-531	5HK-D1	
C28	680			SID680	DE-681	TP50	GP2K-681	UC-5388	5GA-T68	
C29	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C30	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C31	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C32	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C33	1000			BPD-001	DD-103	K069	801-001	DC-521	5HK-D1	
C34	5			NPO-E15	TCZ-4R7	Z011	NPOA-050	Z7-555	5TCCB-V47	
C35	5			NPO-S15	TCZ-4R7	Z011	NPOA-050	Z7-555	5TCCB-V47	
C36	5000			BPD-005	DD-503	K080	811-005	DC-525	5HK-D5	
C37	.22	300		P388N-23		CUB2P23		PT403	27M-P23	
C38	.1	300		P388N-1	DF-104	CUB2P1		PT401	27M-P1	
C39	51									
C40	3.3			NPO-S13.3	TCZ-3R3	Z008	NPOA-3R3	Z7-5533	5TCCB-V33	
C41	33			NPO-S23	TCZ-330	TZ18	NPOL-330	Z7-5433	5TCC-Q33	
C42	.1	400		P468N-1	DF-104	CUM2P1		PT401	47M-P1	
C43	100	500		NPO-E100	D6-101	TZR5T1	801-101		MC8235	MS-31
C44	.022	300		BPD-03	DD-303	CUB2S23	817-03		PT1523	27M-S23
C45	.022	500		BPD-03	DD-303	CUB2S23	817-03		PT1523	67M-S23
C46	30		14B-23773							Note 1
C47	10000			BPD-01	DD-103	K063	811-01	DC-511	5HK-D1	
C48	1000			BPD-001	DD-103	K069	801-001	DC-521	5HK-D1	Note 2
C49	470	500		1494-00047	DE-471	TP54	811-471	MC8245	MS-447	
C50	10000			BPD-01	DD-103	K063	811-01	DC-511	5HK-B1	
C51	10000			BPD-01	DD-103	K063	811-01	DC-511	5HK-B1	
C52	10			NPO-S10	TCZ-100	TZ09	NPOK-100	UC-541	5GA-Q10	
C53	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C54	.01	400		BPD-01	DD-203	CUB4S21	GP33-103	PT511	47M-S1	
C55	.01	600		BPD-01	D6-103	CUB5S21	GP3-333-103	PT611	67M-S1	
C56A	270			SID270		TP41	GP2K-271	UC-5537	5GA-T27	
B	10000		†17A-54313	BPD-01	†PC-383	K063	811-01	DC-511	5HK-B1	
C	25			SID25		TP25	GPUK-250	UC-5425	5GA-Q25	
C57	.047	300		BPD-03	DF-303	CUB2S47		PT1457	27M-S47	
C58A	3000							DC-523		
B	5000		⌀17A-32376	⌀PA-100	⌀PC-100	⌀1S7TM1	⌀1405-01	DC-525	⌀V-1	
C	1000							DC-521		
C59	2000			SID200	D6-202	TP56	GP3-333-202	UC-523	5GA-D2	
C60	.1	300		P388N-1	DF-104	CUB2P1		PT401	27M-P1	
C61	.033	400		BPD-03	DF-303	CUB4S33		PT1533	47M-S33	
C62	.1	300		P388N-1	DF-104	CUB2P1		PT401	27M-P1	
C63	.1	400		P468N-1	DF-104	CUM2P1		PT401	47M-P1	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP	VOLT	REPLACEMENT DATA: RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C64	1000	1500		HYD-15-1000	DD30-102	MCDI	1R5KV-102	DC3021	30GA-D1	
C65	82	500		1469-00082	TC2-820	22R5Q82	NPO-337-830		MS-482	
C66	82	500		1469-00082	TC2-820	22R5Q82	NPO-337-830		MS-482	
C67	82	500		1469-00082	TC2-820	22R5Q82	NPO-337-830		MS-482	
C68	.047	400		BPD-05	DF-503	CUB4S47		PT1457	47M-S47	
C69	.047	200		BPD-05	DD-503	CUB2S47		PT2457	27M-S47	
C70	.022	200		BPD-03	DD-303	CUB4S23	817-02	PT1123	27M-S23	
C71	.47	300		P388N-47		CUB2P47		PT2447	27M-P47	
C72	270			NPO-E270	TCZ-270	T240	NPO-336-271	MCE241	MS-327	
C73	.01	600								
C74	1000	500		1464-001		1R5DI	811-102	MC8255	MS-31	
C75	.001	800		BPD-001	D6-102	CUB5D1	GP2L-102	PT621	67M-D1	
C76	.047	400		BPD-05	DF-503	CUB4S47		PT2457	47M-S47	
C77	.1	600		P688N-1	DF-104	CUB6P1		PT601	67M-P1	
C78	.15	300		P388N-15		CUB2P15		PT401S	27M-P15	
C79	230	3000	SG-23853	HYD-30-231	DD30-231	VT2S1	5KV-231	DC30333	30GA-T23	
C80	47	3000	SG-24026	HYD 30-47	DD30-470	VT2Q47	5KV-470	DC30447	30GA-Q47	
C81	47	2000	SG-23646	HYD 20-47	DD20-470	VT2Q47	3KV-470	DC20447	20GA-Q47	
C82	5000			BPD-005	DD-503	K080	811-005	DC-525	5HK-D5	
C83A	5000			BPD-2X005	DD3-502	DK079	811-005	DC-525	5HK-D5	
B	5000						811-005	DC-525	5HK-D5	
C84	5000			BPD-005	DD-503	K080	811-005	DC-525	5HK-D5	

Note 1. C45 is the capacitance of the sound IF coupling shield lead.
Note 2. Not used in some versions.
* Items C56A, C56B, C56C, R47A and R47B are combined in one unit.
• Items C58A, C58B, C58C, R54A, R54B and R54C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: RAYTHEON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	10A-23714	F1-4	RTV-486	QJ-724 •	UF15L	Contrast (Panel)
B	1Meg	½		F2-52			UR16A *	Volume (Rear)
C	Switch			KB-1			UR-24 /	Attach to R1B.
R2A	50KΩ	½	10B-23297	AB-31	A47-50K-S	Q1I-133	TA54L	Horizontal Hold
B	Shaft		Not Req.	AK-4	KS5-3	Not Req.	Not Req.	Attach to R2A.
R3A	500KΩ	½	10B-23295	AB-59	A47-500K-S	Q1I-123	TA55L	Brightness
B	Shaft		Not Req.	AK-4	KS5-3	Not Req.	Not Req.	Attach to R3A.
R4A	150KΩ	½	10B-23296	AB-43	A47-150K-S	Q1I-139	TA16L	Vertical Hold
B	Shaft		Not Req.	AK-4	KS5-3	Not Req.	Not Req.	Attach to R4A.
R5A	5000Ω	½	10B-23407	AB-10 †	A47-5000-S †	Q1I-114 †	TA53L †	Vertical Linearity-Slop ai 5000Ω
B	Shaft		Not Req.	AK-1	FKS-1	RQ	Not Req.	Attach to R5A.
R6A	2Meg	½	10B-23696	AB-84	A47-2Meg-S	Q1I-140	TA58L	Vertical Size
B	Shaft		Not Req.	AK-1	FKS-1	RQ	Not Req.	Attach to R6A.
R7A	1Meg	½	10A-23697	AB-89	A47-1Meg-S		U-54	Normal-distant
B	Shaft		Not Req.	AK-3	FS-3		Not Req.	Attach to R7A.
C	Switch		Not Req.	KB-3	SWZ-21		US-26	Attach to R7A.
R8	7500	2	10D-23257		39-750			Buzz (Wire Wound)

• Concentrik Equivalent; K-6 Kit, Base Elements and Shafts; B17-108, P17-102 (Panel) B13-137, R3-115 (Rear)
† Switch (Switch)

* Universal Replacement (Mallory Exact Duplicate Part No. UE58E).
† Connect a 1000Ω resistor in series with the right hand terminal of the control, and the lead connecting to the same, terminal of the original control (control viewed from shaft end, terminals down).

RESISTORS

ITEM No.	RATING: OHMS	WATTS	REPLACEMENT DATA: RAYTHEON PART No.	IRC PART No.	NOTES
R9	680Ω	½		BTS-680K	
R10	470Ω	½		BTS-470K	
R11	2200Ω	½		BTS-2200	
R12	220Ω	½		BTS-220K	
R13	100Ω	½		BTS-100K	
R14	15KΩ	½		BTS-15K	
R15	10KΩ	½		BTS-10K	
R16	2.2Meg	½		BTS-2.2Meg	
R17	220KΩ	½		BTS-220K	
R18	560Ω	½			
R19	1000Ω	½		BTS-1000	
R20	1000Ω	½		BTS-1000	
R21	47Ω	½		BTS-47	
R22	18KΩ	½			
R23	1000Ω	½		BTS-1000	
R24	1000Ω	½		BTS-1000	
R25	62Ω 5%	½	9B1-130	BTS-62 5%	
R26	2700Ω	½	9C11-1104		
R27	33KΩ	½			
R28	1000Ω	½		BTS-1000	
R29	82Ω	½		BTS-82	
R30	1Meg	½		BTS-1Meg	
R31	4700Ω	½		BTS-4700	
R32	1Meg	½		BTS-1Meg	
R33	47Ω	½		BTS-47	
R34	56000Ω	3		BTS-5600	
R35	100KΩ	½		BTS-100K	
R36	22KΩ	½		BTS-22K	
R37	4700Ω	½		BTS-4700	
R38	100KΩ	½		BTS-100K	Note 1
R39	33KΩ	½		BTA-33K	
R40	47Ω	½		BTS-47	
R41	680Ω	7		BTS-680	
R42	220KΩ	½		BTS-220K	
R43	18KΩ	½		BTS-18K	
R44	22KΩ	½		BTS-22K	
R45	15KΩ	½		BTA-150	
R46	10KΩ	½		BTS-10K	
R47A	220KΩ	½	†17A-54313	BTS-220K	
B	2.2Meg	½		BTS-2.2Meg	

ITEM No.	RATING: OHMS	WATTS	REPLACEMENT DATA: RAYTHEON PART No.	IRC PART No.	NOTES
R48	100KΩ	½		BTS-100K	
R49	560KΩ	½		BTS-560K	
R50	22KΩ	½		BTS-22K	
R51	1Meg	½		BTS-1Meg	
R52	1000Ω	½		BTA-1000	
R53	4700Ω	1		BTA-4700	
R54A	22KΩ	½		BTS-22K	
B	8200Ω		•17A-32376	BTS-8200	
C	8200Ω			BTS-8200	
R55	4700Ω	½		BTS-4700	
R56	82KΩ	½		BTS-82K	Note 2
R57	2.2Meg	½		BTS-2.2Meg	
R58	100KΩ	½		BTS-100K	
R59	47KΩ	½		BTS-47K	Note 3
R60	3.3Meg	½		BTS-3.3Meg	
R61	3300Ω	7	9C12-1105	PWV-3300	
R62	560Ω	½			
R63	56Ω	½			
R64	330KΩ	½			
R65	680KΩ	½			
R66	220KΩ	½			
R67	68KΩ	½			
R68	1500Ω	½			
R69	100KΩ	½			
R70	39KΩ	½			
R71	18KΩ	½			
R72	68KΩ	½			
R73	47KΩ	½			
R74	68KΩ	½			
R75	82KΩ	½			
R76	100Ω	½			
R77	470KΩ	½			
R78	820Ω	½			
R79	1.5Ω	½	9C1-1055	BW½-1.5	
R80	2500Ω	½	9C-24033	PWV-2500	
R81	133Ω	15	9C-23872		
R82	9Ω	5	46M-23018		
R83	330KΩ	½		BTS-330K	
R84	470KΩ	½		BTS-470K	
R85	470KΩ	½		BTS-470K	
R86	220KΩ	½		BTS-220K	

Note 1. Some versions use a 470KΩ ½W resistor in this application.
Note 2. Some versions use a 68KΩ ½W resistor in this application.
Note 3. Some versions use a 100KΩ ½W resistor in this application.
† Items R47A, R47B, C56A, C56B, C56C are combined in one unit.
• Items R54A, R54B, R54C, C58A, C58B, C58C are combined in one unit.

TRANSFORMER (FILAMENT)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA: RAYTHEON PART No.	Hallodorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	117VAC	12VCT				13D-23699-3	P5526 1	P5969 1	P6150	21F87
	.30A	2.1A								

① Drill new mounting holes.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: RAYTHEON PART No.	Hallodorson PART No.	Merit PART No.	RCA TYPE No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T2	Horiz. Output Trans.	12E-23259	FB457 *	HVO-58 *		X158 *	FLY80 *	D-71 *
T3	Vert. Output Trans.	12E-23738	Z1804	A-3037	22GT1	V313	26552	A-102K
T4A	Yoke(70°) Horiz.(6MH)	20L-24563-1 ①	DF601 ②	MDY70 ②	20GD1 ②	Y70F08 ② ③	Y-5&2 ② ③	Y-12-1 ②
B	Vert. (46MH)	16M-24480 ③						

① Includes resistors R83 and R83.
② Use original horizontal damping network.
③ Requires centering device.
④ Yoke rear cover and centering device.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

ORIGINAL TERMINAL CONNECTIONS	Hallodorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordorson Replacement Connections	Triad Replacement Connections
8	8	8	8	8	8	8	8
6	6	6	6	6	6	6	6
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: RAYTHEON PART No.	Hallodorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T5	8.4KΩ	3-4Ω	12C-23704	Z1113	A3038	A3078	24680	S-7X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: RAYTHEON PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	8"	PM	3-4Ω	18A-21433	6A1	22S81	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	REPLACEMENT DATA: RAYTHEON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Transformer	0Ω	0Ω	1056-25326				
L2	Ant. Matching Transformer	0Ω	0Ω	1055-25325				
L3	IF Trap			1056-25261				
L4A	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1055-25258-2				Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-25258-3				Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1055-25258-4				Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-25258-5				Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-25258-6				Channel 6
F	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1055-25260-7				Channel 7
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-25260-8				Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-25260-9				Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-25260-10				Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-25260-11				Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-25260-12				Channel 12
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-25260-13				Channel 13
L5	RF Coil	0Ω		1055-25231				
L6	1st Video IF	.9Ω		1056-25233				Not used in some versions.
L7	28.25MC Trap			13M-25686				
L8	2nd Video IF	.1Ω		201-23259	17-1004 •	TV-103 *	6183 *	
L9	3rd Video IF	.2Ω		201-24043				
L10	RF Choke	2.5Ω		201-20295	19-5036	TV-180	6176	36 Microhenries
L11	4th Video IF	.2Ω	.2Ω	13B-23871				
L12	Series Peaking Coil	3.1Ω		16A-22923	19-6022		6152	22 Microhenries
L13	Series Peaking Coil	3.1Ω		16A-22923	19-6022		6152	22 Microhenries
L14	Shunt Peaking Coil	24Ω		16A-19365	19-4400		6136	470 Microhenries
L15A	4.5MC Trap	1.9Ω		201-23729				
B	1st Sound IF	3Ω						
L16	Series Peaking Coil	7.8Ω		16A-21391	19-3300		6185	306 Microhenries
L17	Shunt Peaking Coil	7.8Ω		16A-20970	19-3280	TV-185	6180	270 Microhenries

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	RAYTHEON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L18	Series Peaking Coil	2.5Ω		16A-24090	19-1005		4612	11 Microhenries
L19	4.5MC Trap	1Ω		16A-25441	20-1004	TV-151	1469	
L20	2nd Sound IF	.3Ω	.3Ω	201-23873			6203	
L21	Quadrature Coil	4.8Ω		201-23727	20-1005		1480	
L22	RF Choke	1.6Ω		16A-21701	19-1005		4612	8 Microhenries

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	RAYTHEON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L23	8Ω		12E-24440			6212				Tapped @ 6Ω
L24	38Ω									

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	RAYTHEON PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L25	.220ADC	37.5Ω	.5HY	16A-23889-1	C5040	C2994	C2327	26C41	C-23X

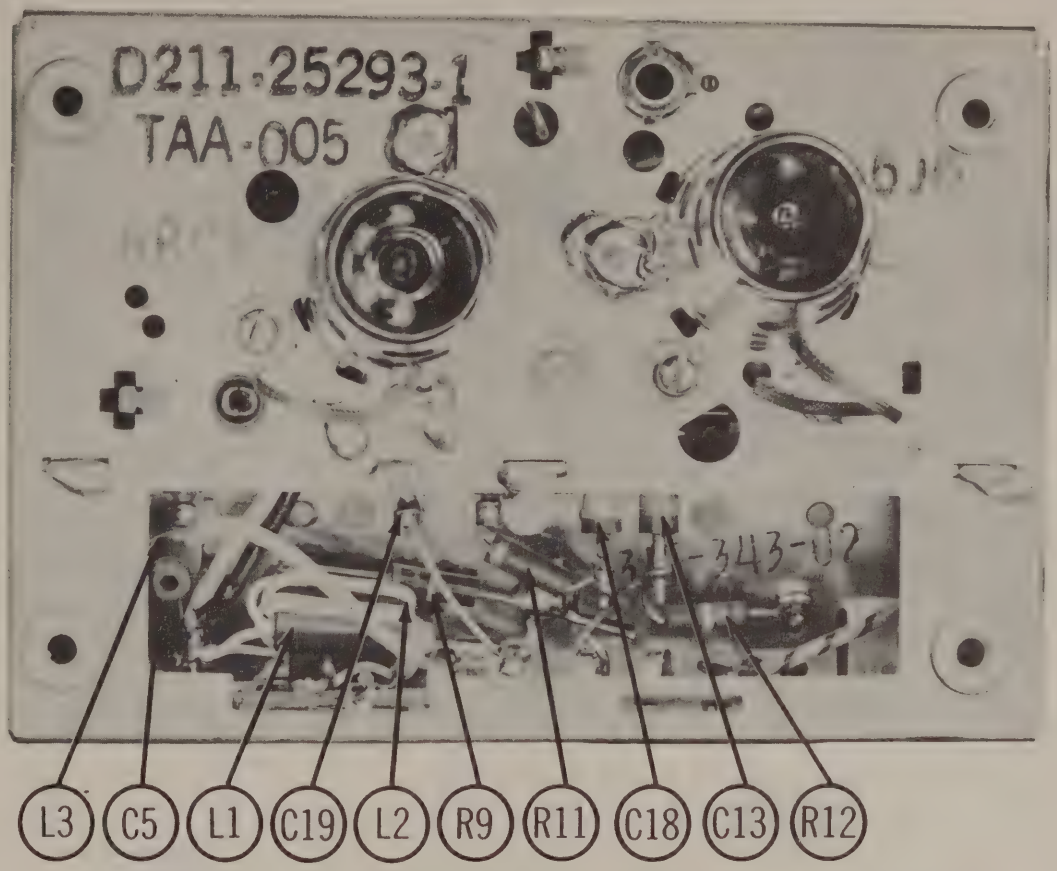
SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	RAYTHEON PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.220ADC	2U-23840	1236A	MR300	6S300	6Q4	250	
M2	.220ADC	2U-23840	1236A	MR300	6S300	6Q4	250	

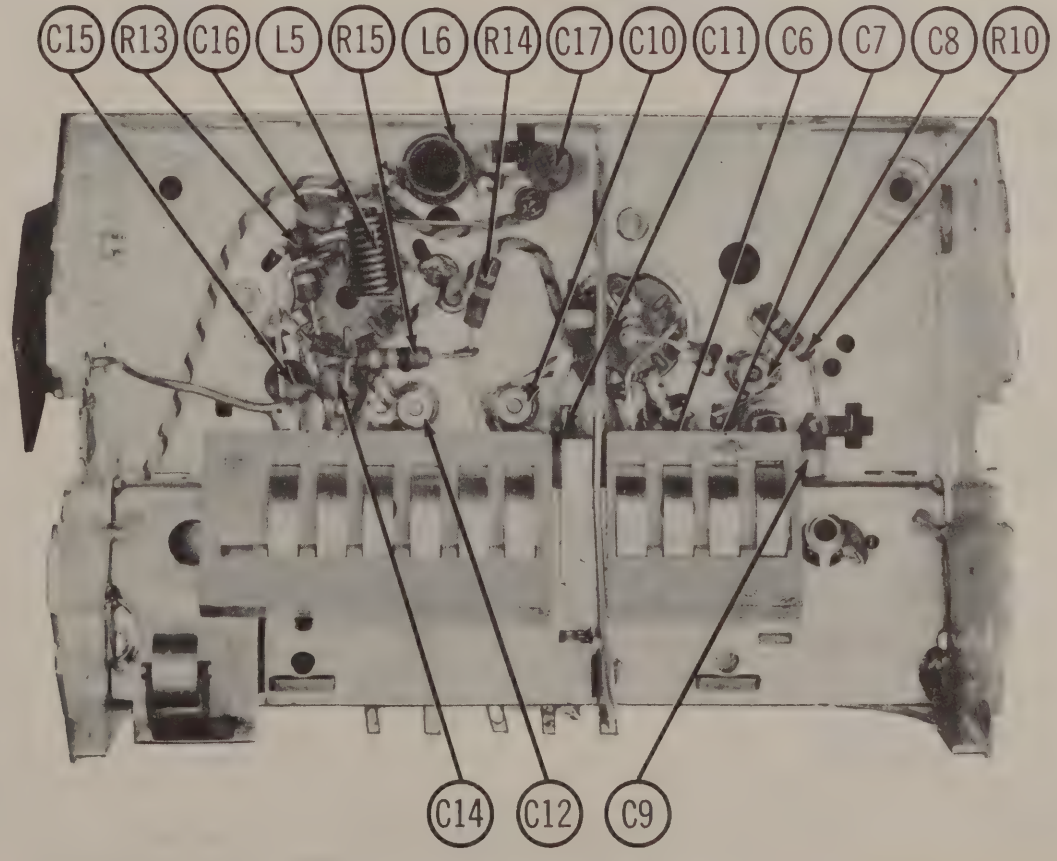
MISCELLANEOUS

ITEM No.	PART NAME	RAYTHEON PART No.	NOTES
M3	Tuner	21I-25293-1	VHF (Pentode)
M4	Centering Device	16M-24493	Part of Deflection Yoke (T4) Rear Cover
M5	Ion Trap	16M-19706 *	
	Cabinet	2B-25330-A177	Model C-2175-M
	Cabinet	2B-25330-A178	Model C-2175-B
	Knob	5B-24136-A29	Fine Tuning
	Knob	5B-24138-A29	Picture
	Knob	5B-25299-A76	VHF Indicator-Model C-2175M
	Knob	5B-25299-A56	VHF Indicator-Model C-2175B
	Knob	5B-25300-A76	On-Off-Volume-Model C-2175M
	Knob	5B-25300-A56	On-Off-Volume-Model C-2175B
	Knob	5B-23839-A76	Control (3 used)-Model C-2175M
	Knob	5B-23839-A56	Control (3 used)-Model C-2175B
	Mask	25M-25301	
	Safety Glass	30M-25418	

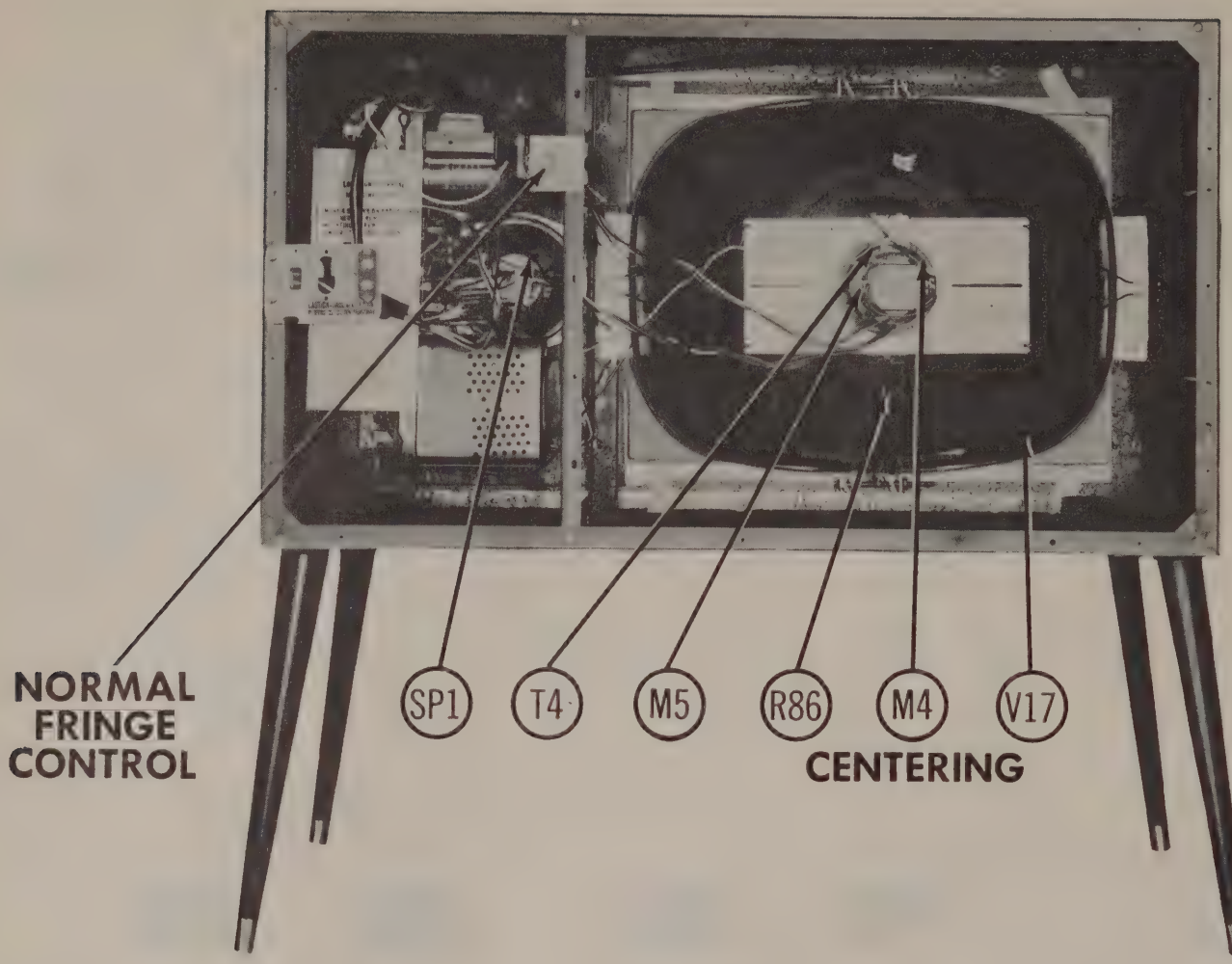
* Alternate Part #16M-19705.



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Turn the horizontal hold control (R2) to its mid-range position. Connect a short clip lead across L22. Adjust horizontal oscillator slug (B1) until the picture synchronizes horizontally. Remove clip lead from L22. Connect the vertical amplifier of the oscilloscope thru a low capacity probe to point Ⓒ. Low side to chassis. Adjust the horizontal stabilizer coil (B2) until a waveform similar to Fig. 5 is obtained. While making this adjustment, keep the picture in sync with the horizontal hold. Remove scope connection. Check range of horizontal hold control (R2). Turn R2 fully counter clockwise then back clockwise. The picture should fall out of sync at each extreme setting of R2.

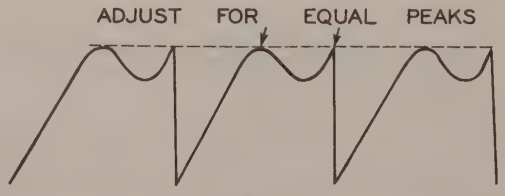
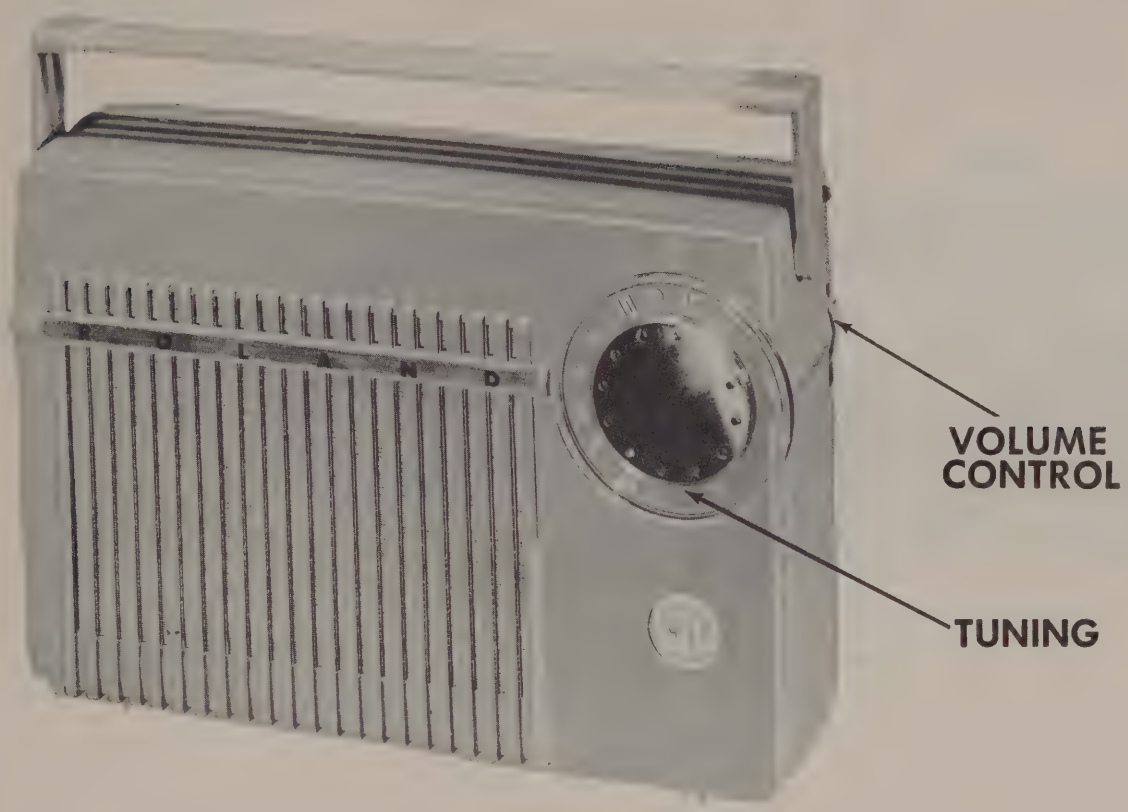


FIG. 5

ROLAND
MODEL 5P5



ROLAND
MODEL 5P5

TRADE NAME	Roland Model 5P5
MANUFACTURER	Roland Radio Corp., 12-30 Anderson Ave., Mt.Vernon, N.Y.
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Converter, 1U4 IF Amplifier, 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY	110-120 Volts AC-DC (or) 7.5 Volts "A" Supply & 67.5 Volts "B" supply
RATING	.12 Amp. @ 117 Volts AC (or) 55MA @ 7.5 Volts DC & 9.5MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"
4.		"	600KC	Tune to 600KC signal	"	A7	Adjust for maximum output while rocking tuning gang.

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PARTS LIST AND DESCRIPTIONS

ROLAND
Model 5P5

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		ROLAND PART No.	STANDARD REPLACEMENT	
V1	Converter	1R5	1R5	
V2	IF Amplifier	1U4	1U4	
V3	Det.-AVC-AF Amplifier	1U5	1U5	
V4	Output	3V4	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ROLAND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	60	150					CDB-1012	T-300	
B	60	150							
C	100	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ROLAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	1.5			NP0A-S11.5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C3	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C4	3			NP0-SI3.3	TCZ-3R3	TZ06	NP0A-030	ZT-553	5TCCB-V33	
C5	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	220			BPD-00022	D6-221	G051	811-221	UC-5322	5GA-T22	
C7A	150									
B	2000									
C	150		♦		♦PC-165					
D	10000									
E	5000									
C8	2000			BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C9	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C10	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C11	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	

♦ Items C7A, C7B, C7C, C7D, C7E, R8A, R8B, R8C and R8D are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ROLAND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½						Volume

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ROLAND PART No.	IRC PART No.	
R2	100KΩ	½		BTS-100K	
R3	15KΩ	½		BTS-15K	
R4	10Meg	½		BTS-10Meg	
R5	47KΩ	1/3		BTR-47K	
R6	3.3Meg	1/3		BTR-3.3Meg	
R7	150Ω	½		BTS-150	

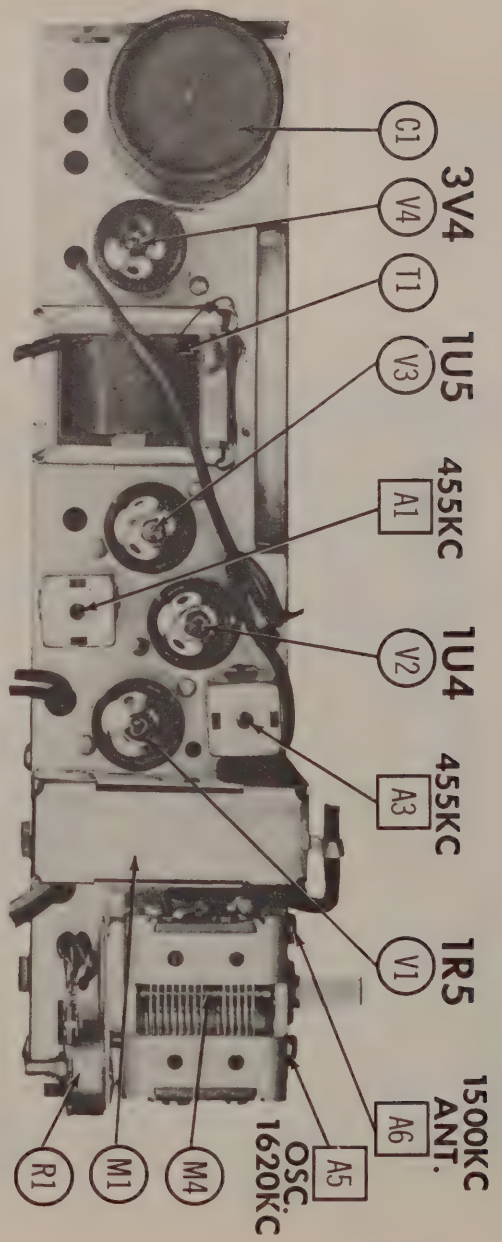
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	ROLAND PART No.	IRC PART No.	
R8A	10Meg		♦	BTS-10Meg	
B	4.7Meg			BTS-4.7Meg	
C	1Meg			BTS-1Meg	
D	3.3Meg			BTS-3.3Meg	
R9	680Ω	½		BTS-680	
R10A	750Ω	15			
B	1500Ω	15			
R11	75Ω	2			

♦ Items R8A, R8B, R8C, R8D, C7A, C7B, C7C, C7D, C7E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ROLAND PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	10KΩ	3-4Ω			A2927			S-11Z	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ROLAND PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3 - 4Ω	SP106	4A07	223S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ROLAND PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	1.7Ω						
L2	Osc. Coil	.8Ω	5Ω	LC-52	14-1073		69-OSC *	
L3	Input IF	16Ω	16Ω	LF-62	16-6800		12-C1	
L4	Output IF	16Ω	16Ω	LF-62	16-6801		12-C2	

* Use leads as mounting support.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	ROLAND PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.056ADC		1003A	RS75	6S65		65	

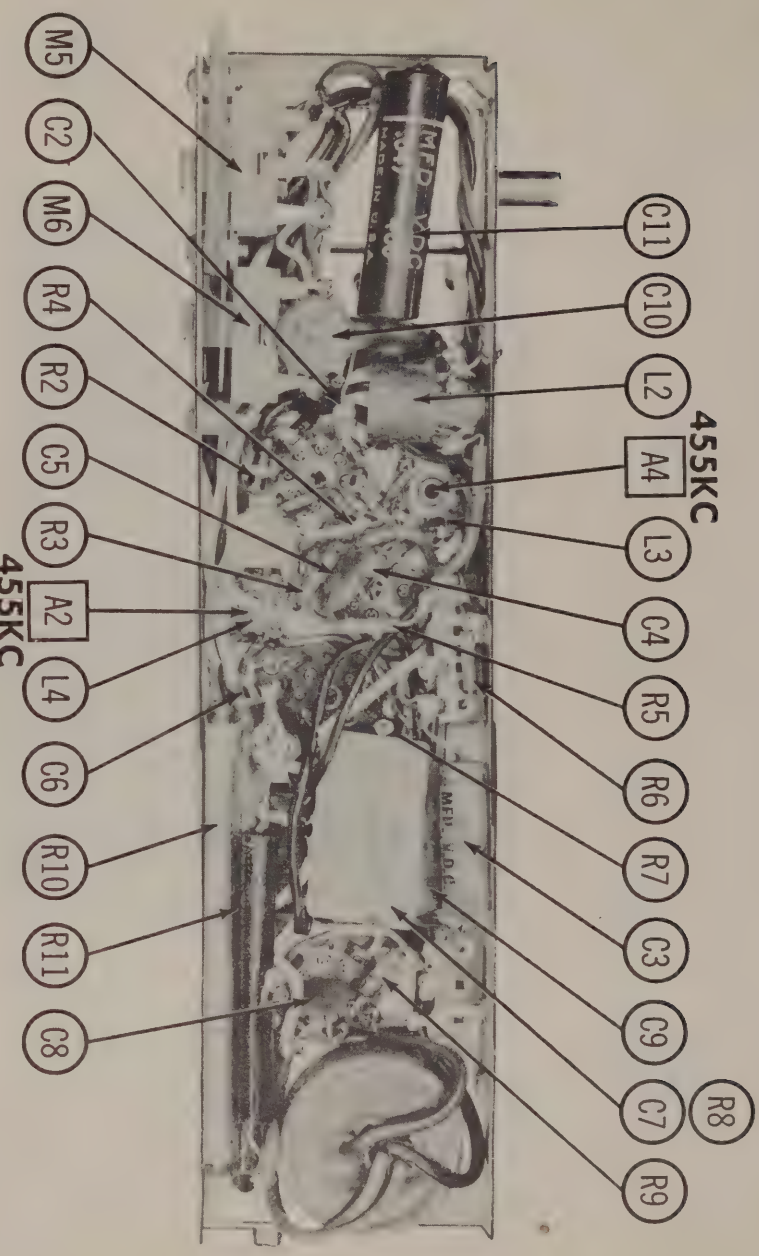
BATTERIES

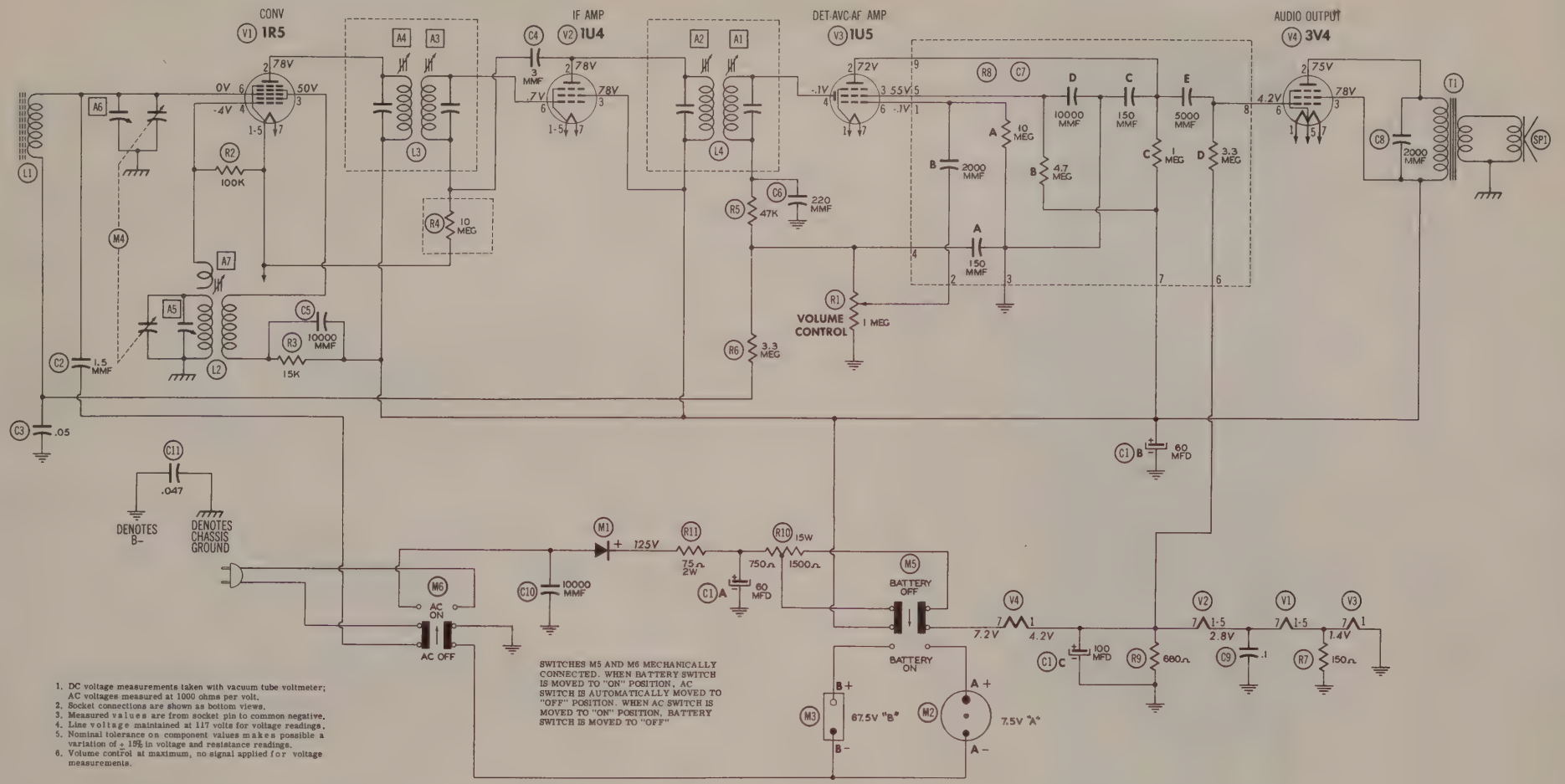
ITEM No.	VOLTAGE	ROLAND PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	7.5V"A"		717			C5			
M3	67.5V"B"			477			P45		

MISCELLANEOUS

ITEM No.	PART NAME	ROLAND PART No.	NOTES
M4	Tuning Cap.		2 Gang (8-215MMF, 12-110MMF)
M5	Switch		Battery (DPDT-Slide type)
M6	Switch		AC (DPDT-Slide Type)

CHASSIS—BOTTOM VIEW





1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

SWITCHES M5 AND M6 MECHANICALLY CONNECTED. WHEN BATTERY SWITCH IS MOVED TO "ON" POSITION, AC SWITCH IS AUTOMATICALLY MOVED TO "OFF" POSITION. WHEN AC SWITCH IS MOVED TO "ON" POSITION, BATTERY SWITCH IS MOVED TO "OFF"

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†825Ω	†15.8KΩ	100KΩ	*	4.3Meg	*
V 2	1U4	*	†825Ω	†825Ω	TP	*	10Meg	*
V 3	1U5	*	†1Meg	†4.7Meg	1Meg	NC	10Meg	*
V 4	3V4	*	†1.2KΩ	†825Ω	NC	*	3.3Meg	*

† MEASURED FROM OUTPUT OF M1.
NC - NO CONNECTION.
TP - TIE POINT
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE

IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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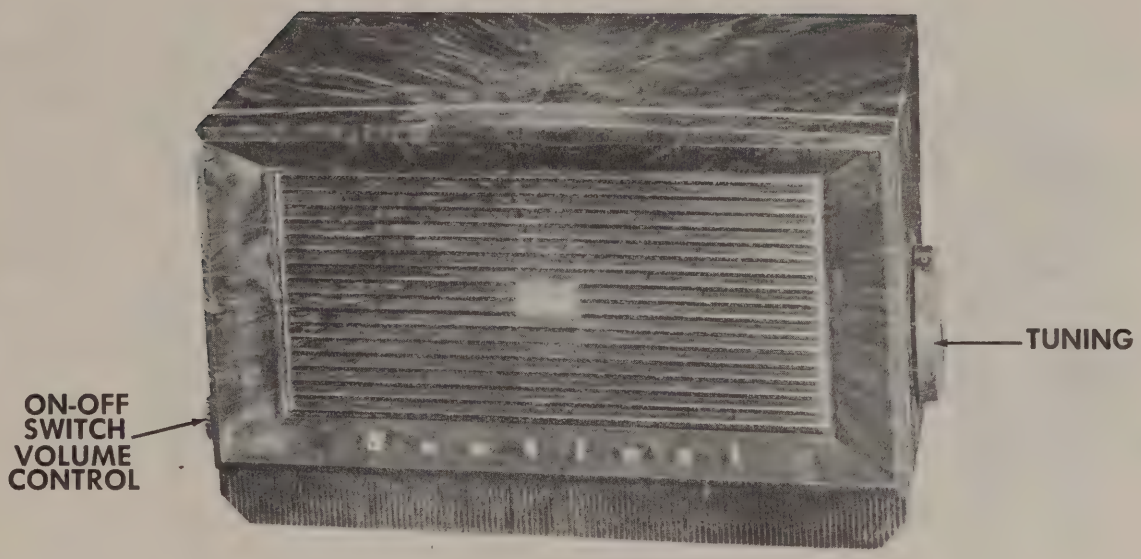
SENTINEL
MODEL 1U-363



SENTINEL
MODEL 1U-363

TRADE NAME	Sentinel Model 1U-363
MANUFACTURER	Sentinel Radio Corp., 2100 W. Dempster, Evanston, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC — RATING .26 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.02MFD	High side to antenna lug on tuning gang. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A4	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

SENTINEL
Model IU-363

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		SENTINEL PART No.	STANDARD REPLACEMENT	
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det.-AVC-AF Amplifier	12AV6	12AV6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SENTINEL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	25E76	PRS150V40-4020	BBRT44215	TCT3116	TDL-404020-150	FMT-315	TVA-3448
B	40	150							
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SENTINEL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	200		23E4000-29	SI200	D6-201	TP38	GP2K-201	UC-532	5GA-T2	
C3	.047	200	23E3214	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C4	30		†23E2022-4	SI30	D6-330	G028	GP1K-300	UC-5433	5GA-Q3	
C5	.01	400	23E3410	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C6A	220									
B	5000									
C	5000		♦23E2041-6	♦PA-113-2	♦PC-151	♦116TM2	♦1408-02		♦DT-2	
D	250									
E										
C7	10000		23E4004-17	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C8	.047	400	23E3414	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C9	.1	400	23E3416	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

† Items C4 and R3 are combined in one unit.
♦ Items C6A, C6B, C6C, C6D, C6E, R8A, R8B and R8C are combined in one unit.
When replacing items separately, C6D and C6E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SENTINEL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½	28E107	ABT-65	A47F5-500K	Q19-133X	UT431	Volume- tap ⓐ 300KΩ
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	KB-1	SWE-12	76-1	US-26	Attach to R1A

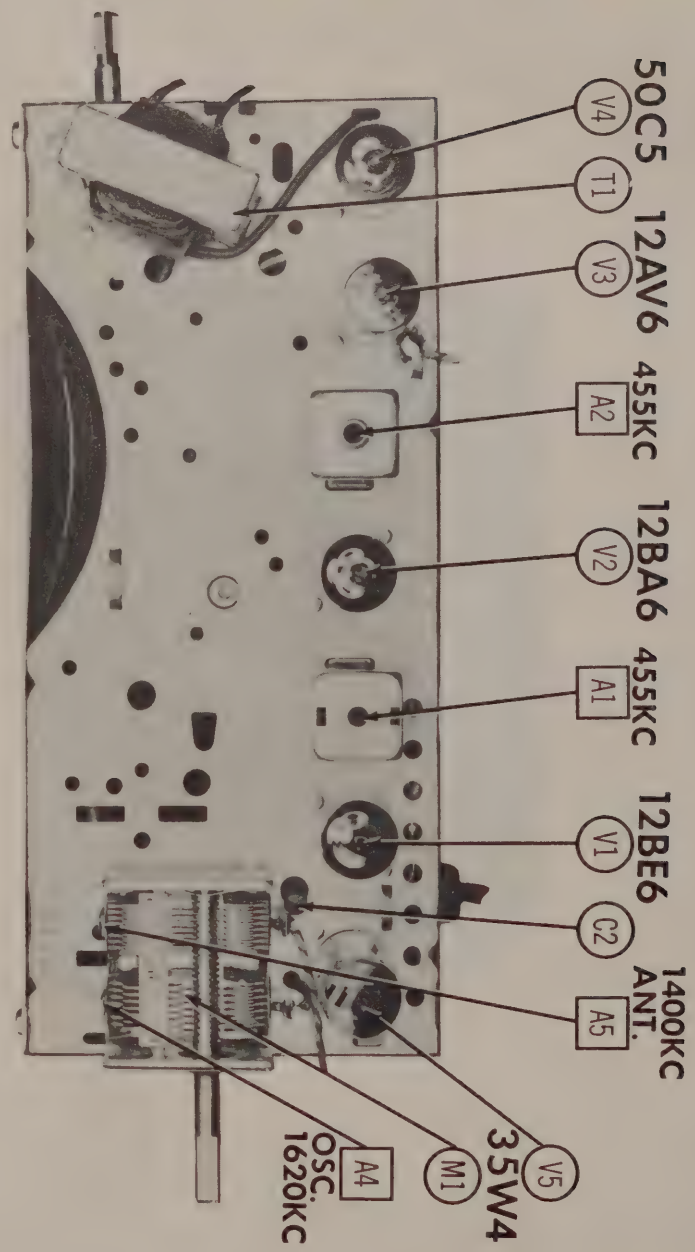
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SENTINEL PART No.	IRC PART No.	
R2	1Meg	½	27E105M-½	BTS-1Meg	
R3	22KΩ		† 23E2022-4	BTS-22K	
R4	3.3Meg	½	27E335M-½	BTS-3.3Meg	
R5	68Ω	½	27E680K-½	BTS-68	
R6	47KΩ	½	27E473K-½	BTS-47K	
R7	27KΩ	½	27E273K-½	BTS-27K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SENTINEL PART No.	IRC PART No.	
R8A	6.8Meg		♦23E2041-6	BTS-6.8Meg	
B	470KΩ			BTS-470K	
C	470K			BTS-470K	
R9	150Ω	½	27E151-½	BTS-150	
R10	220Ω	1	27E221K-1	BTA-220	
R11	1200Ω	1	27E122K-1	BTA-1200	

† Items R3, C4 are combined in one unit.
♦ Items R8A, R8B, R8C, C6A, C6B, C6C, C6D, C6E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SENTINEL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3.1KΩ	3.4Ω	22E98	Z1105 ①	A2931 ①	A3876	24S45	S-1X	① Ignore hum bucking taps.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	SENTINEL PART No.	QUAM PART No.	RCA TYPE No.	
SP1	5 x 7"	PM	3.4Ω	1E57	57A1	257S1	

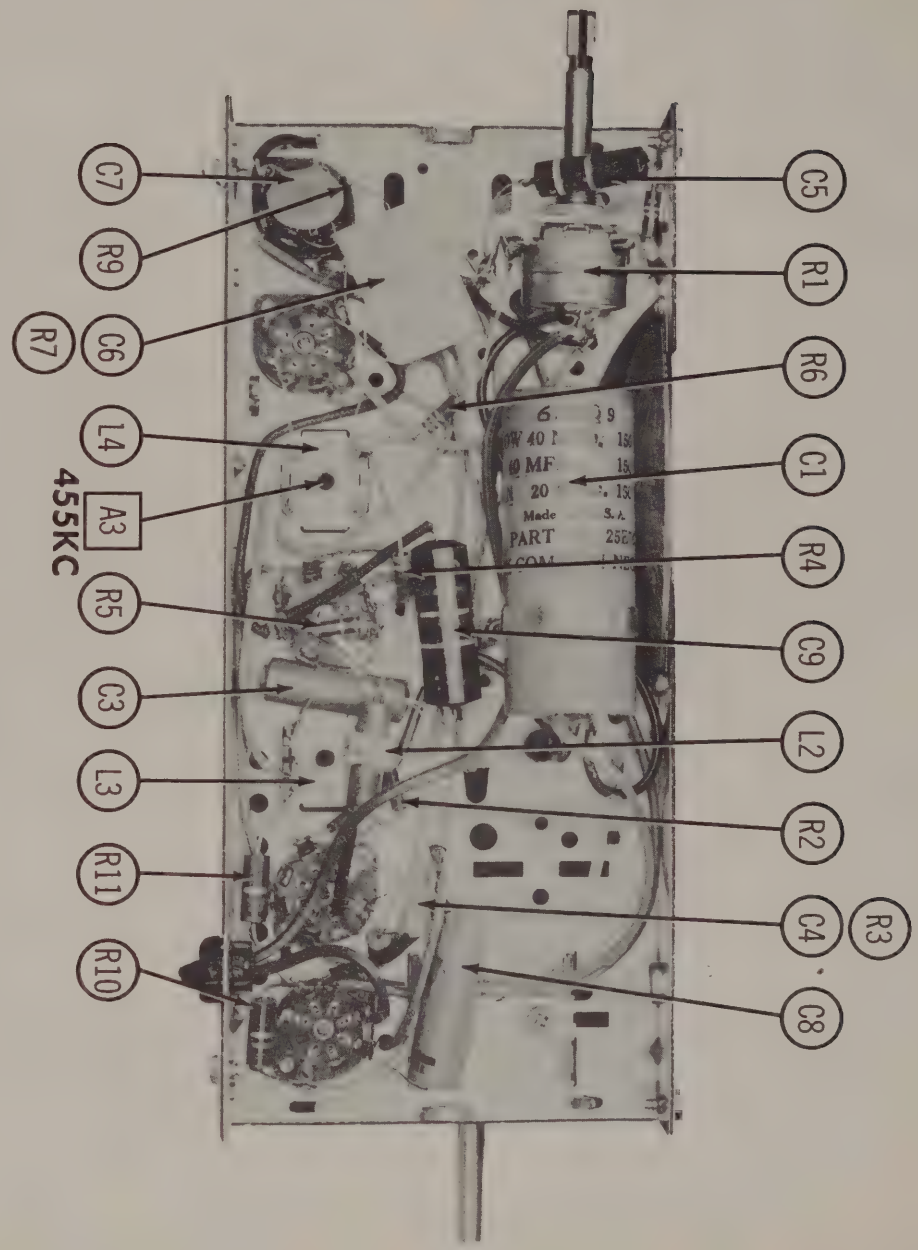
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SENTINEL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.7Ω		64E36-3				Includes cabinet back
L2	Osc. Coil	1.2Ω	10.5Ω	20E938	14-1074	BC-394	70-OSC	
L3	Input IF	15Ω	15Ω	20E732	16-6758	BC-352	12-C1	
L4	Output IF	17Ω	17Ω	20E997	16-6758	BC-353	12-C2	

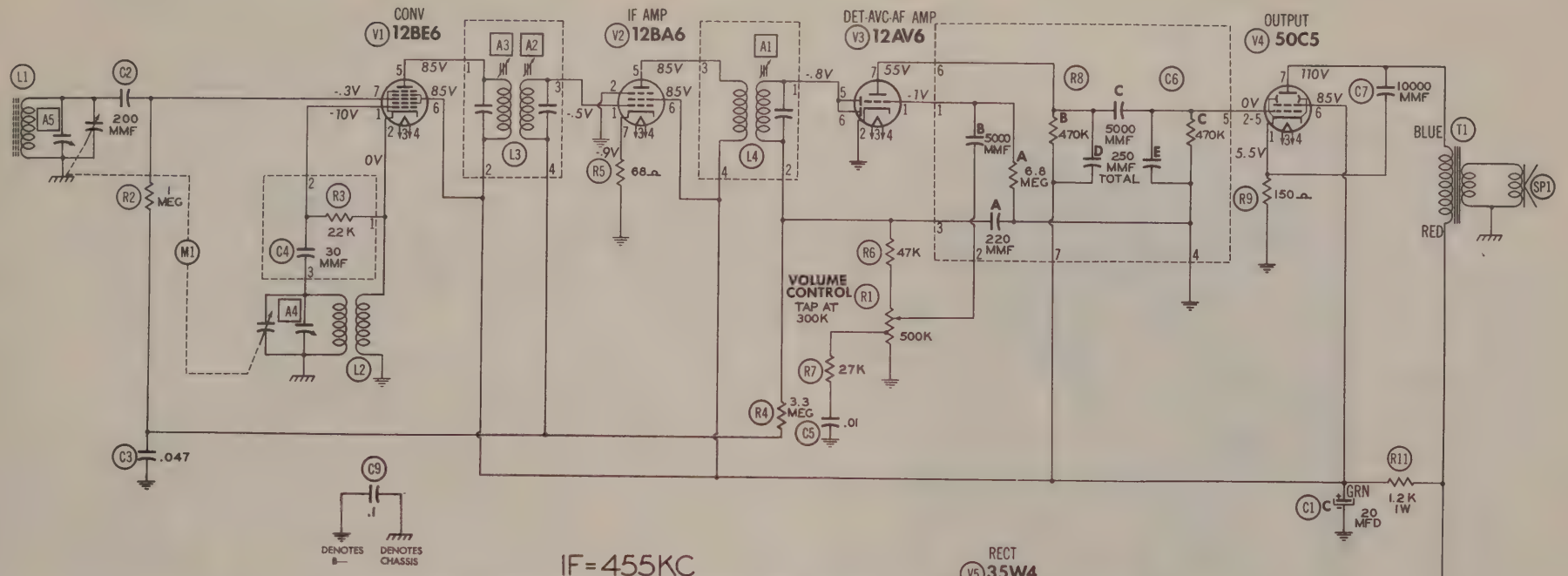
MISCELLANEOUS

ITEM No.	PART NAME	SENTINEL PART No.	NOTES
M1	Tuning Cap.	24E63	2 Gang (12-235MMF, 13-105MMF)
	Cabinet	7E467	Green
	Cabinet	7E467-2	Tan
	Cabinet	7E467-3	Ivory
	Cabinet	7E467-4	Mahogany
	Cabinet	7E467-5	Red
	Cabinet	7E467-6	Rust
	Cabinet	7E467-7	Yellow
	Cabinet	7E467-8	Gray
	Knob	35E37-24	Station selector - green
	Knob	35E37-25	Station selector - tan
	Knob	35E37	Station selector - ivory
	Knob	35E37-3	Station selector - mahogany
	Knob	35E37-9	Station selector - red
	Knob	35E37-6	Station selector - rust
	Knob	35E37-22	Station selector - yellow
	Knob	35E37-23	Station selector - gray
	Knob	37E47-20	On-off-volume - green
	Knob	37E47-21	On-off-volume - tan
	Knob	37E47-13	On-off-volume - ivory
	Knob	37E47-12	On-off-volume - mahogany
	Knob	37E47-14	On-off-volume - red
	Knob	37E47-17	On-off-volume - rust
	Knob	37E47-27	On-off-volume - yellow
	Knob	37E47-28	On-off-volume - gray

CHASSIS—BOTTOM VIEW



SENTINEL Model IU-363



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	1Ω	12Ω	24Ω	†1.4KΩ	†1.4KΩ	4.8Meg
V 2	12BA6	3.8Meg	0Ω	24Ω	36Ω	†1.4KΩ	†1.4KΩ	68Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	547KΩ	547KΩ	†471KΩ
V 4	50C5	150Ω	470KΩ	86Ω	36Ω	470KΩ	†1.4KΩ	†450Ω
V 5	35W4	NC	TP	86Ω	121Ω	121Ω	115Ω	50KΩ

† MEASURED FROM PIN 7 OF V5.
NC - NO CONNECTION.
TP - TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PHOTOFACT* Folder

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RETMA MEMBER

SETCHELL-CARLSON MODEL P-61 (Ch. C-100)

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SETCHELL-CARLSON
MODEL P-61 (Ch. C-100)

TRADE NAME	Setchell-Carlson Model P-61 (Ch. C-100)
MANUFACTURER	Setchell-Carlson, Inc., New Brighton, Minn.
TYPE SET	Television Receiver
TUBES	Nineteen
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.46 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 48.75MC, Sound IF 44.25MC (Intercarrier)

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DATE 4-56 SET 313 FOLDER 13

SETCHELL-CARLSON MODEL P-61 (Ch. C-100)

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs and metal trim from top panel of cabinet.

2. Remove 6 metal screws and 2 metal screws from antenna terminal bracket. Remove rear cover.

3. Remove 4 chassis bolts. Remove chassis.

MODEL	CHASSIS
P-61	C-100

SETCHELL-CARLSON
MODEL P-61 (Ch. C-100)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector, fine tuning, on/off volume and contrast knobs. Also, remove trim plate. Adjustments are accessible one at a time thru the small in the cabinet to the left of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 6 metal screws holding bezel to cabinet front. Pull bezel off; remove safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See cabinet rear view on page 16.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjust the horizontal hold control to synchronize the picture horizontally. If the horizontal hold control will not synchronize the picture, replace V14 (12AU7A).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate the sound IF detector buzz, adjust the ratio detector secondary (L16) located on top of the chassis. (See tube location chart).

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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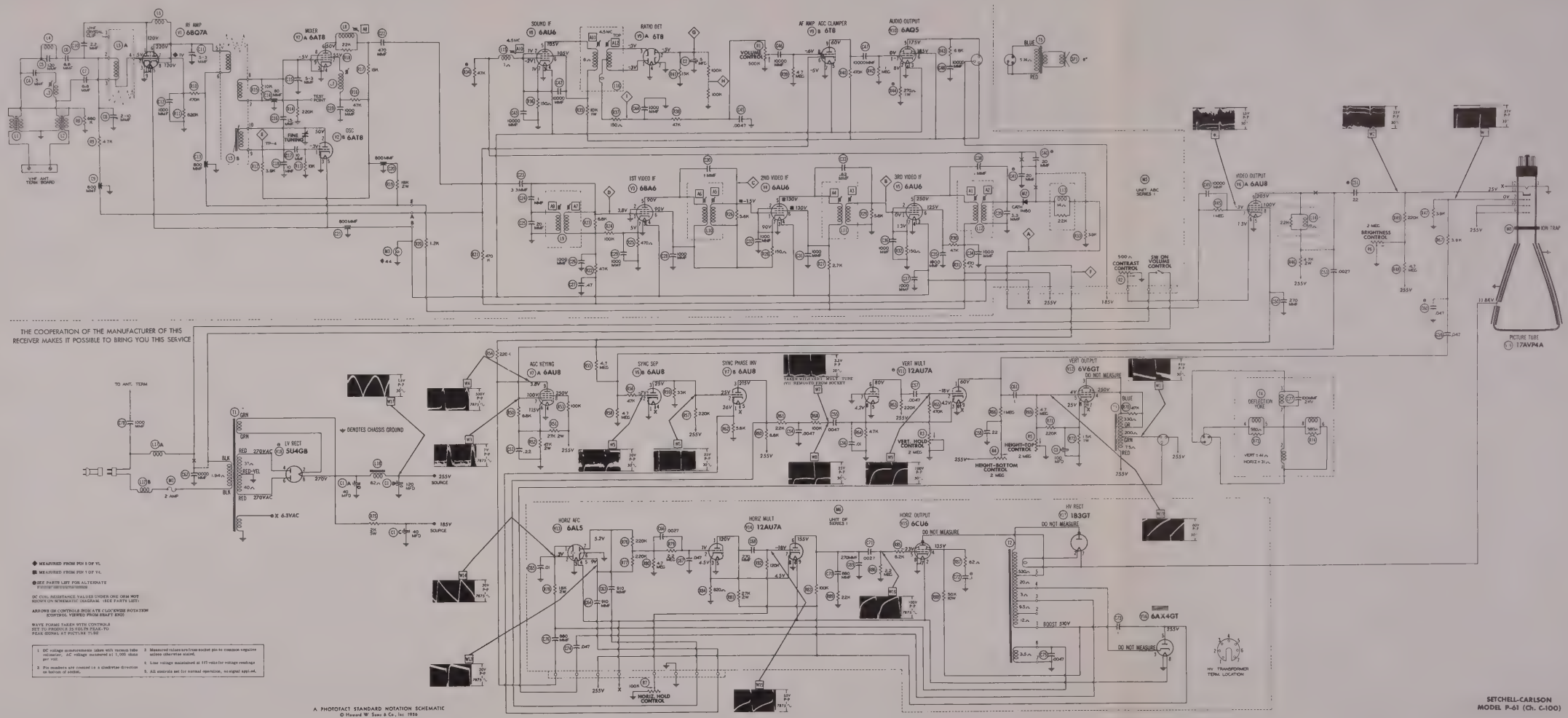
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
RF AMP V1 6BQ7A
MIXER V7 A 6AT8
OSC V2 B 6AT8
SOUND IF V8 6AU6
RATIO DET V9 A 6T8
AF AMP AGC CLAMPER V9 B 6T8
AUDIO OUTPUT V10 6AQ5
1ST VIDEO IF V3 6BA6
2ND VIDEO IF V4 6AU6
3RD VIDEO IF V5 6AU6
VIDEO OUTPUT V6 A 6AU8
AGC KEYING V7 A 6AU8
SYNC SEP V8 B 6AU8
SYNC PHASE INV V7 B 6AU8
VERT MULT V11 12AU7A
VERT OUTPUT V12 6V6GT DO NOT MEASURE
LV RECT V13 5U4GB
HORIZ AFC V13 6AL5
HORIZ MULT V14 12AU7A
HORIZ OUTPUT V15 6CU6 DO NOT MEASURE
HV RECT V17 1B3GT DO NOT MEASURE
V16 6AX4GT
PICTURE TUBE V 17AVP4A
UNIT ABC SERIES 1
UNIT DF SERIES 1
CONTRAST CONTROL
BRIGHTNESS CONTROL
VOLUME CONTROL
FM ON VOLUME CONTROL
HEIGHT-TOP CONTROL 2 MEG
HEIGHT-BOTTOM CONTROL 2 MEG
VERT HOLD CONTROL 2 MEG
HORIZ HOLD CONTROL
DEFLECTION YOKE
ION TRAP
BOOST 530V
HV TRANSFORMER TERM. LOCATION
TO ANT. TERM
VHF ANT TERM. BOARD
TUNE POINT
FINE TUNING
DENOTES CHASSIS GROUND
255V SOURCE
185V SOURCE
X 6.3VAC
2 AMP
270VAC
◆ MEASURED FROM PIN 5 OF V1.
■ MEASURED FROM PIN 1 OF V4.
●SEE PARTS LIST FOR ALTERNATE
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
ARROWS ON CONTROLS SHOW ATR CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 2.25 VOLTS PEAK-TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction as bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise noted.
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation, no signal applied.
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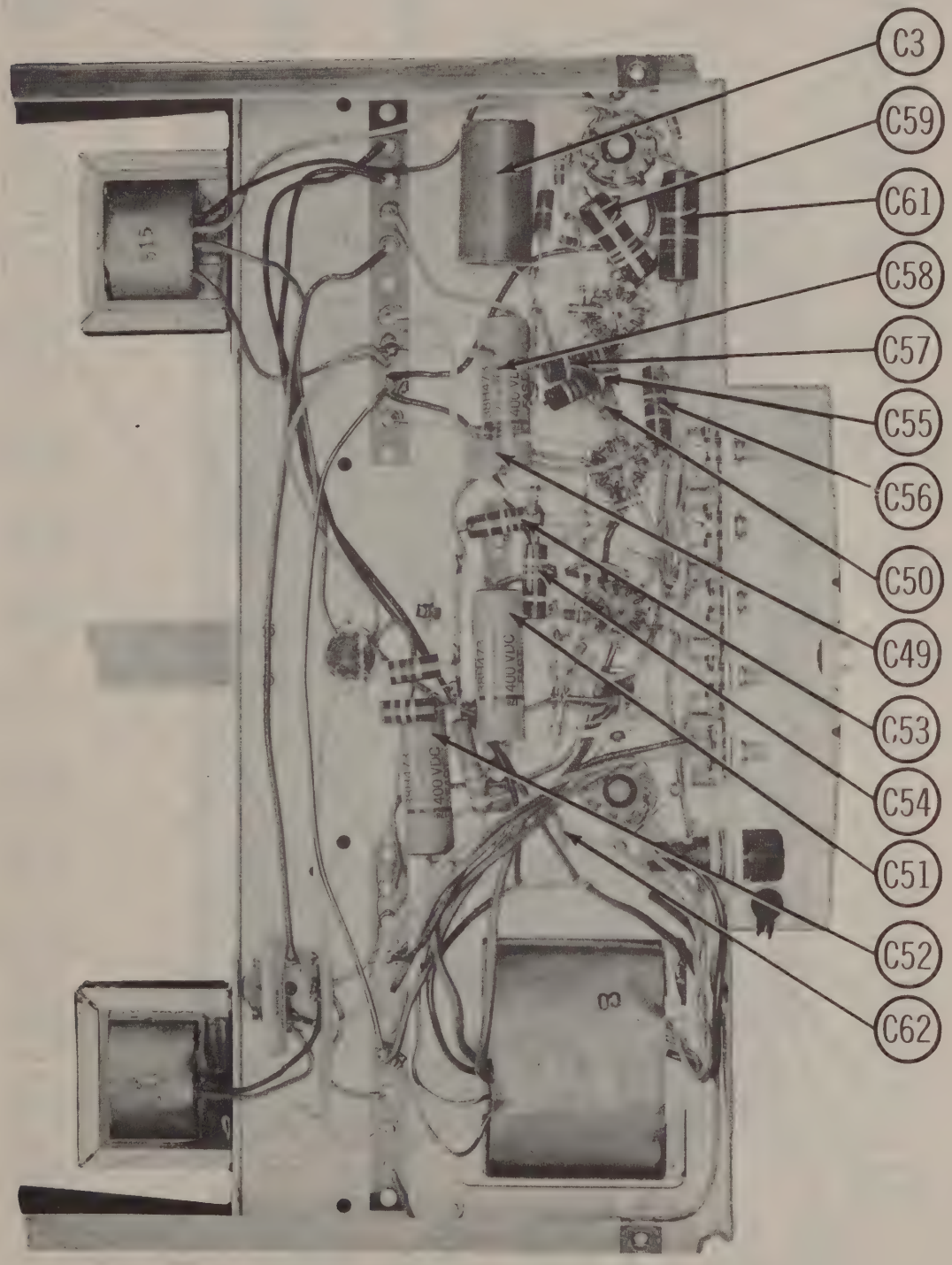
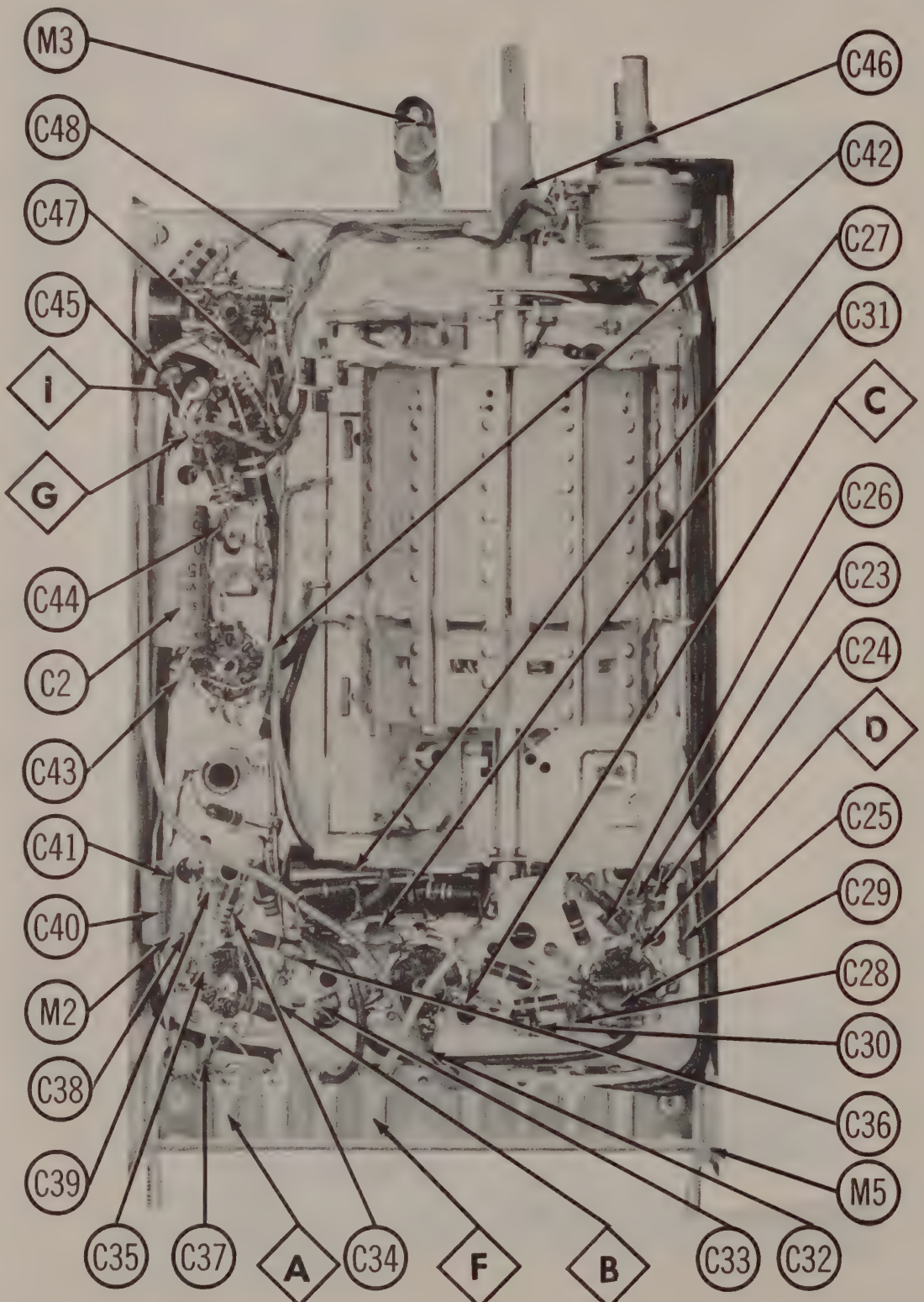


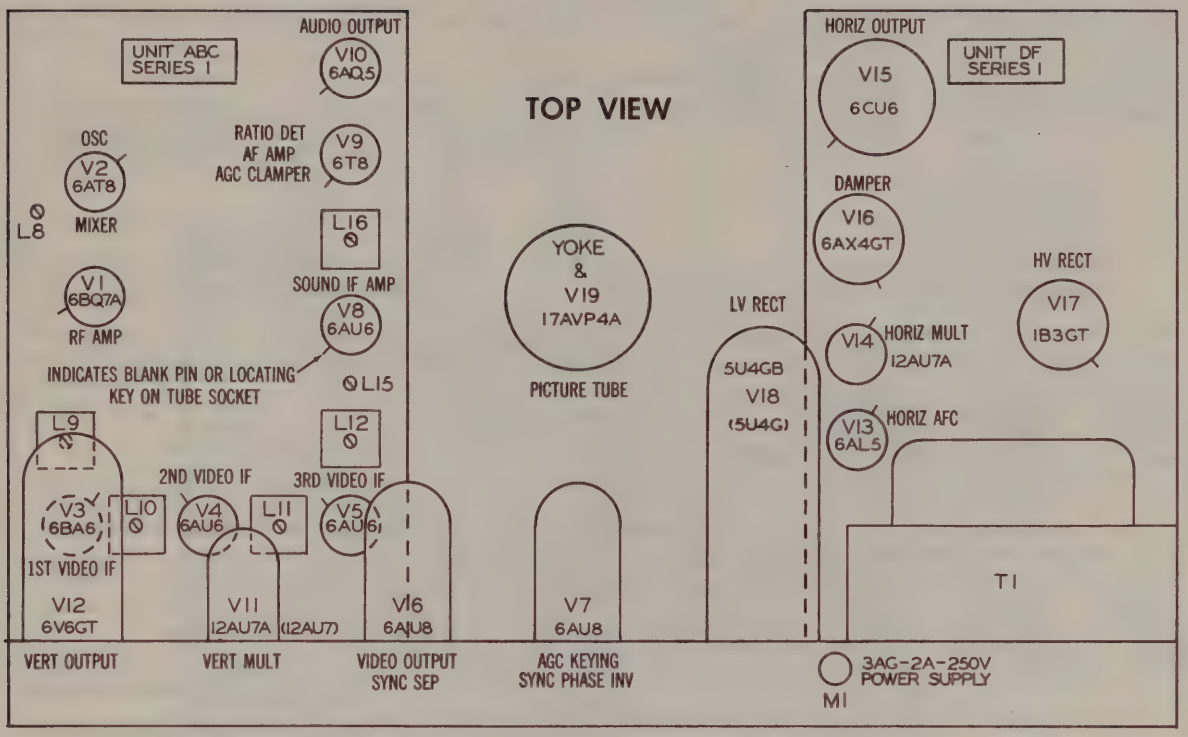
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

SET 313 FOLDER 13



RF-IF CHASSIS-BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V18, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V19
Has pic, no sound - V8, V9, V10
Overloaded picture - V7, V9

SYNC FAILURE
No vert. sync - V7, V11
No horiz. sync - V7, V13, V14
No vert. or horiz. sync - V6, V7

SWEEP FAILURE
No raster, has sound - V14, V15, V16, V17, V19
No vertical deflection - V11, V12
Poor vert. linearity or foldover - V11, V12
Poor horiz. linearity or foldover - V14, V15, V16
Narrow picture - V14, V15, V16, V17, V18
Vert. off freq. - V7, V11
Horiz. off freq. - V7, V13, V14

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped away from the chassis.

VIDEO IF ALIGNMENT

Remove the mixer oscillator tube from its socket. This will disable the local oscillator and reduce the possibility of erroneous indications. Connect the negative lead of a 9 volt battery to point (F). Positive lead to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.01MFD	High side to point (B). Low side to chassis.	46.5MC (10MC Swp.)	48.75MC 44.25MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A1, A2	Adjust for response curve similar to Fig. 1. Adjust to place 48.75MC marker at 50% and 44.25MC marker in sound trap as in Fig. 1.
2.	"	High side to point (C). Low side to chassis.	"	"	"	"	A3, A4	"
3.	"	High side to point (D). Low side to chassis.	"	"	"	"	A5, A6	"
4.	"	High side to point (E). Low side to chassis.	"	"	"	"	A7, A8, A9	Adjust for response similar to Fig. 1. Repeat steps 1 thru 4 if necessary to obtain proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (G) to chassis. The junction of these two resistors is alignment point (H) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	Direct	High side to point (A). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (G). Common to chassis.	A10, A11	Adjust for maximum deflection.
6.	"	"	"	"	DC probe to point (I). Common to point (H)	A12	Adjust for zero deflection. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Direct	High side to point (A). Low side to chassis.	4.5MC (450KC Swp.)	4.5MC	Any	Vert. Amp. to point (G). Low side to chassis.	A10, A11	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry as in Fig. 2.
6.	"	"	"	"	"	Vert. Amp. to point (I). Low side to chassis.	A12	Reconnect C2. Adjust so that 4.5MC marker occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A11 for maximum amplitude and straightness of crossover lines

TUNER ALIGNMENT

The tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

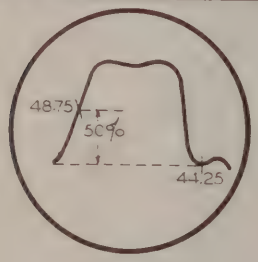


FIG. 1

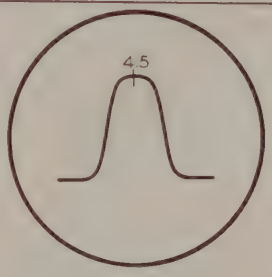


FIG. 2

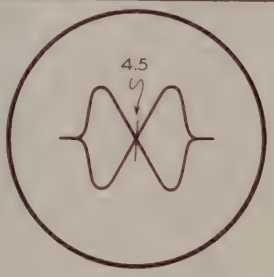
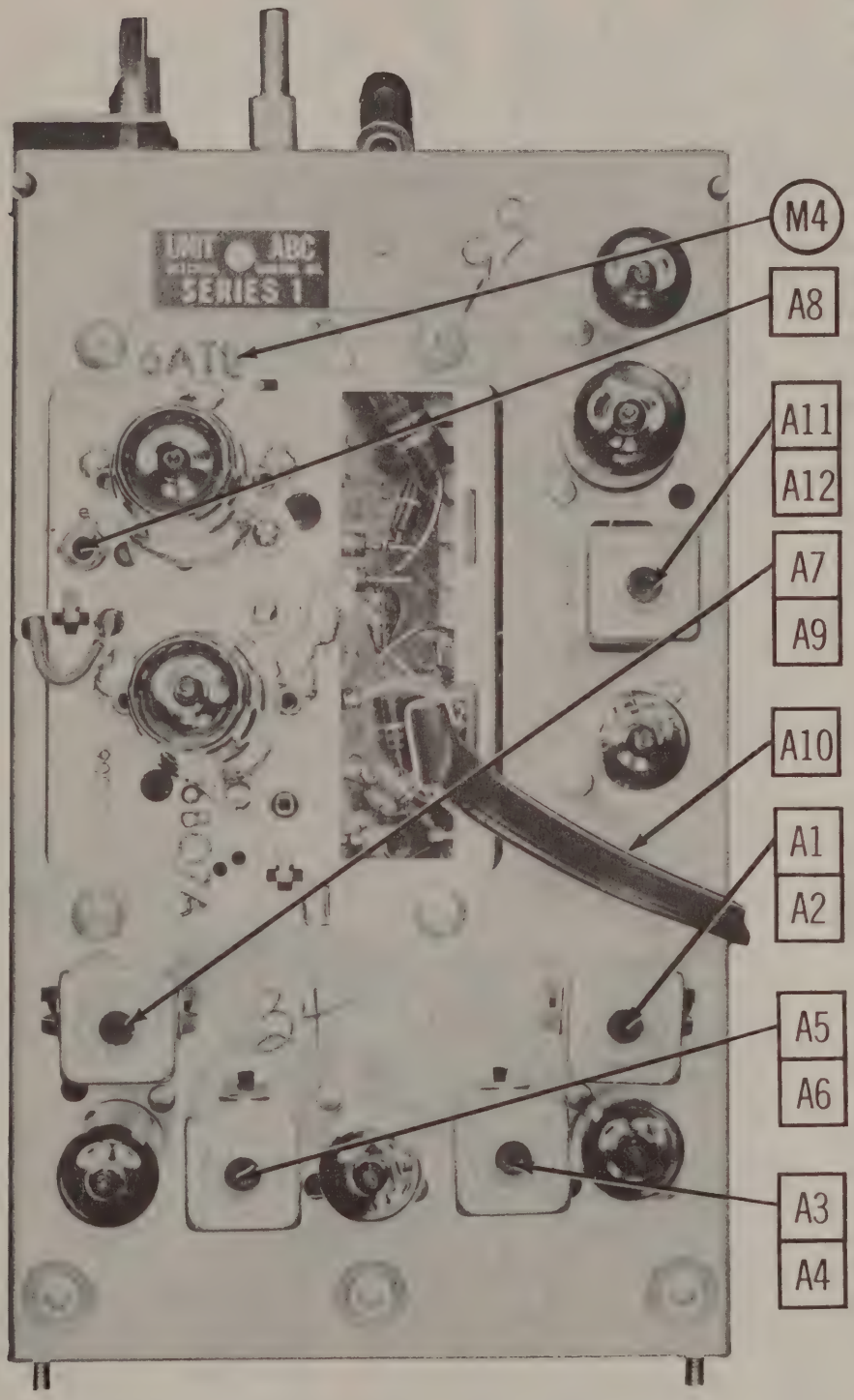


FIG. 3

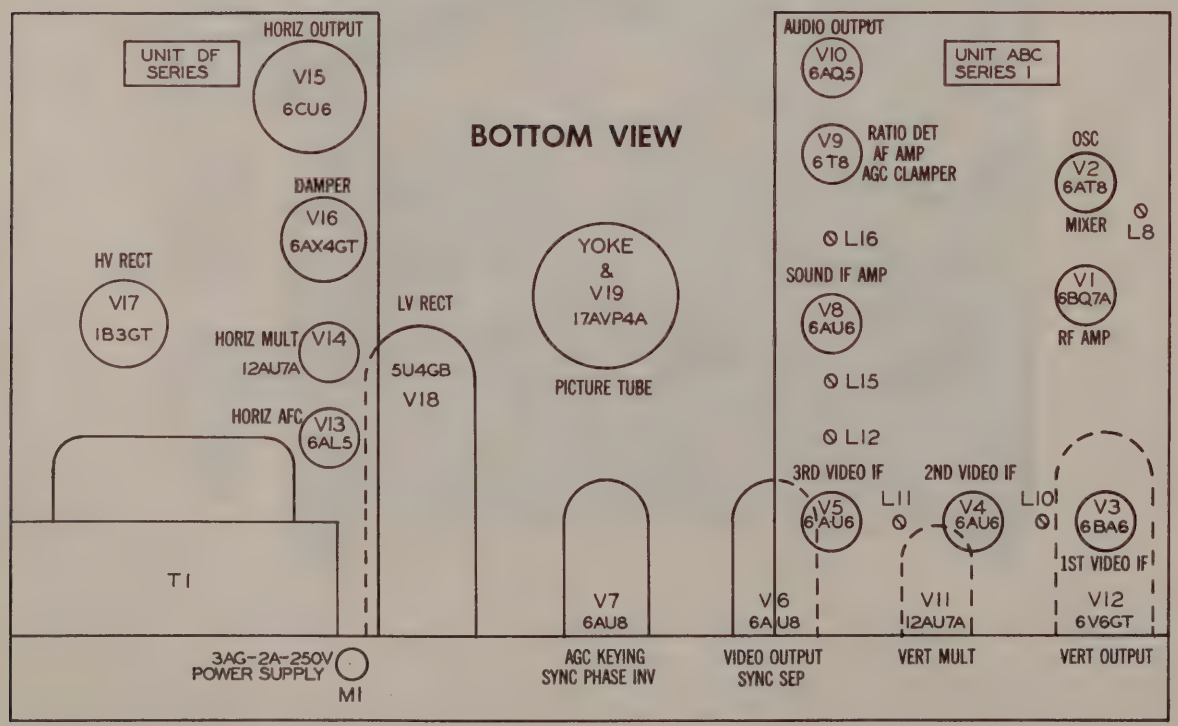


RF-IF CHASSIS-TOP VIEW

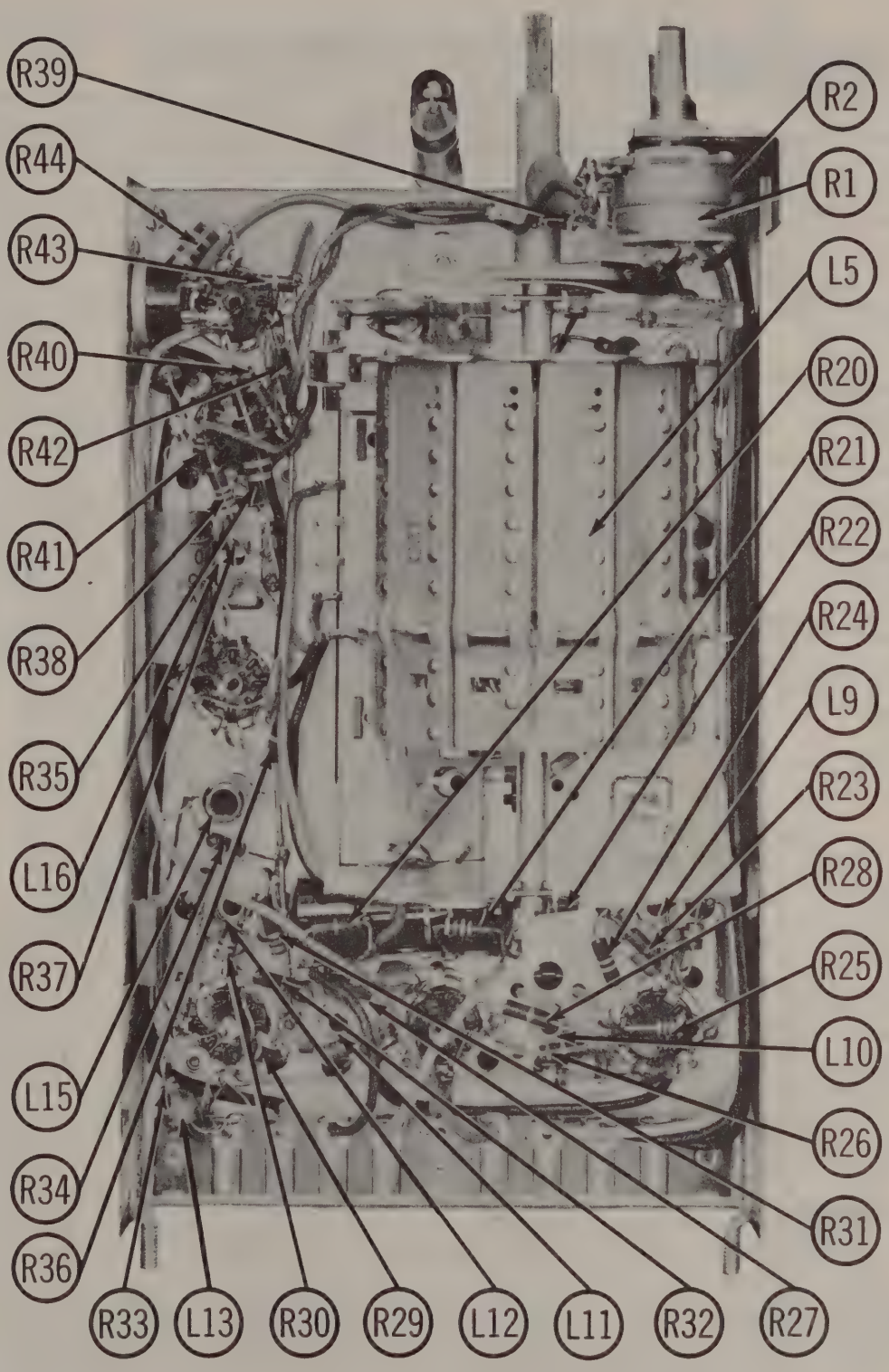
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	600KΩ	0Ω	0Ω	.1Ω	† 1.2KΩ	350KΩ	INF	0Ω
V 2	6AT8	10KΩ	† 23KΩ	0Ω	0Ω	.1Ω	† 34KΩ	† 65KΩ	0Ω	220KΩ
V 3	6BA6	100KΩ	0Ω	0Ω	.1Ω	▲ 150Ω	▲ 150Ω	470Ω		
V 4	6AU6	▲ 150Ω	INF	0Ω	.1Ω	† 2.7KΩ	† 2.7KΩ	INF		
V 5	6AU6	0Ω	150Ω	.1Ω	0Ω	† 530Ω	† 47KΩ	150Ω		
V 6	6AU8	0Ω	2.5Meg	† 70KΩ	.1Ω	0Ω	120Ω	1Meg	† 30KΩ	† 4.7KΩ
V 7	6AU8	5.6KΩ	† 70KΩ	† 6.8KΩ	0Ω	.1Ω	† 27KΩ	† 30KΩ	† 100KΩ	400KΩ
V 8	6AU8	47KΩ	150Ω	0Ω	.1Ω	† 12KΩ	† 12KΩ	150Ω		
V 9	6T8	500KΩ	15KΩ	500KΩ	0Ω	.1Ω	600KΩ	0Ω	4.7Meg	† 470KΩ
V 10	6AQ5	1Meg	270Ω	.1Ω	0Ω	† 2.4KΩ	† 2KΩ	1Meg		
V 11	12AU7A	† 2Meg	1Meg	4.7KΩ	0Ω	0Ω	† 220KΩ	0Ω	4.7KΩ	.1Ω
V 12	6V6GT	TP	0Ω	† 600Ω	† 260Ω	5Meg	TP	.1Ω	1.5KΩ	
V 13	6AL5	18KΩ	18KΩ	0Ω	.1Ω	5Meg	0Ω	5Meg		
V 14	12AU7A	† 27KΩ	7Meg	820Ω	0Ω	0Ω	† 100KΩ	170KΩ	820Ω	.1Ω
V 15	6CU6	TP	.1Ω	TP	▲ 50KΩ	2.2Meg	NC	0Ω	0Ω	TOP CAP ▲ 20Ω
V 16	6AX4GT	TP	NC	INF	NC	† 62Ω	TP	0Ω	.1Ω	
V 17	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 550Ω
V 18	5U4GB	NC	55KΩ	NC	38Ω	NC	40Ω	NC	55KΩ	
V 19	17AVP4A	0Ω	3.9KΩ	PIN 6 † 62Ω	PIN 10 † 62Ω	PIN 11 † 300KΩ	PIN 12 .1Ω			

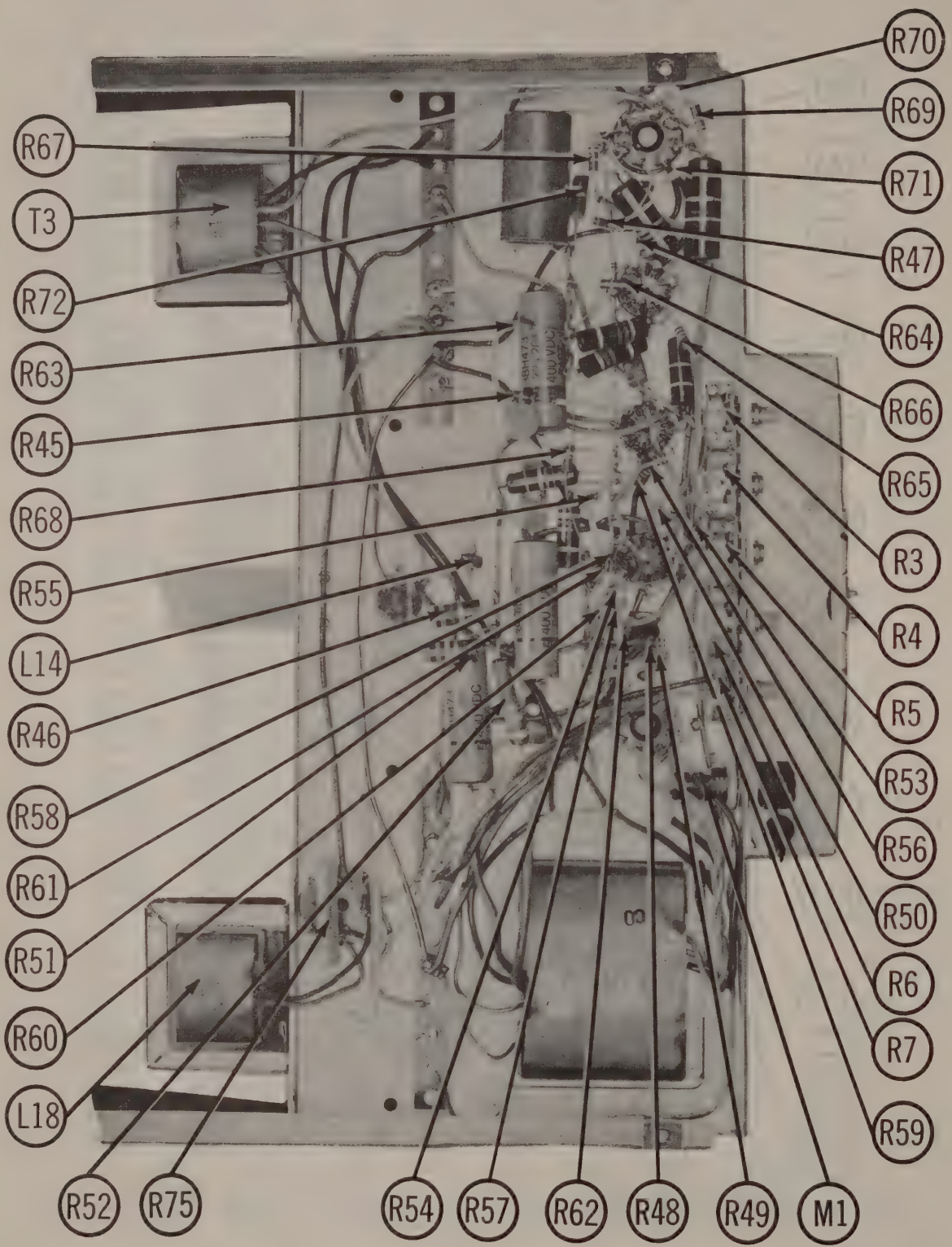
† MEASURED FROM PIN 8 OF V18.
▲ MEASURED FROM PIN 7 OF V4.
▲ MEASURED FROM PIN 3 OF V16.
TP-TIE POINT.
NC-NO CONNECTION.



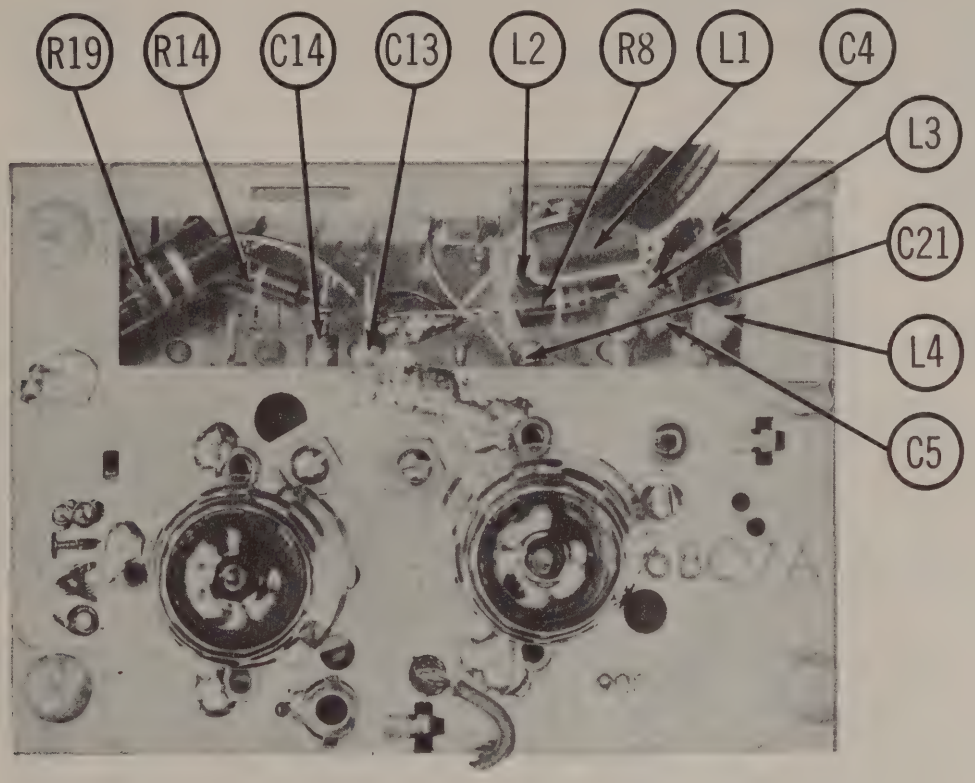
TUBE PLACEMENT CHART



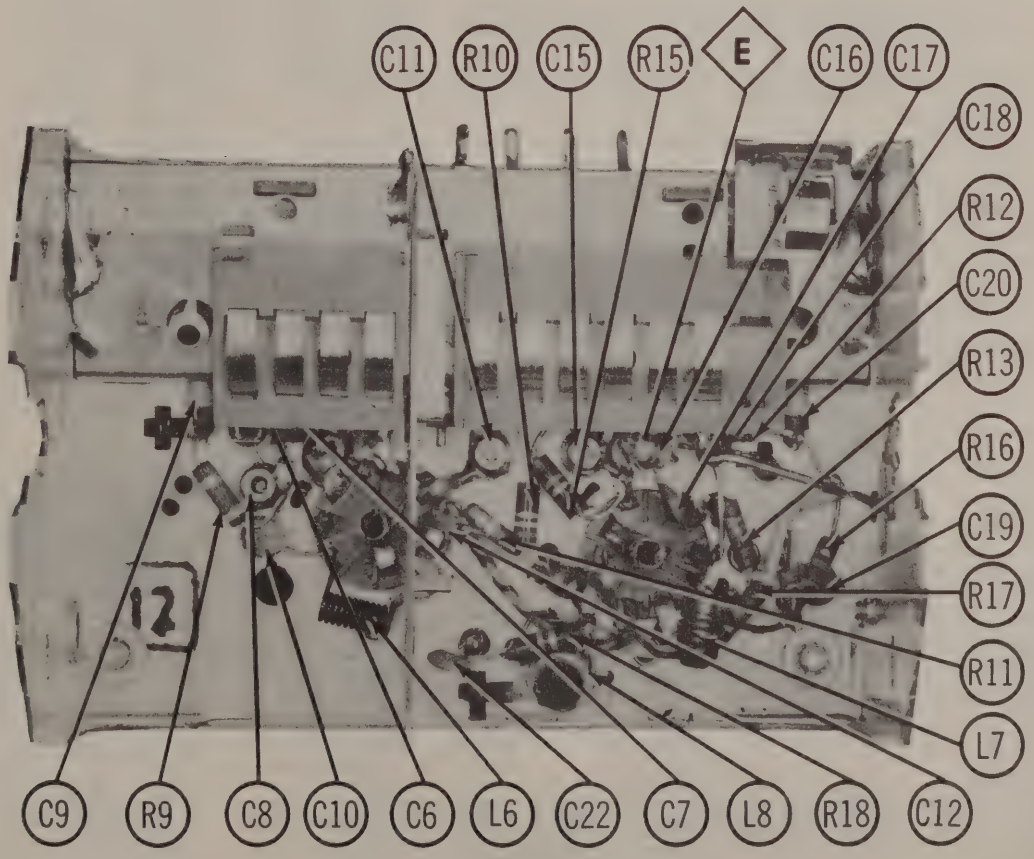
RF-IF CHASSIS-RESISTOR AND INDUCTOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: Setchell-Carlson PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	
V2	Mixer-Oscillator	6AT8	6AT8	
V3	1st. Video IF Amplifier	6BA6	6BA6	
V4	2nd. Video IF Amplifier	6AU6	6AU6	
V5	3rd. Video IF Amplifier	6AU6	6AU6	
V6	Video Output-Sync Sep.	6AU8	6AU8	
V7	AGC Keying-Sync Phase Inverter	6AU8	6AU8	
V8	Sound IF Amplifier	6AU6	6AU6	
V9	Ratio Detector-AF Amp. - AGC Clamper	6T8	6T8	
V10	Audio Output	6AQ5	6AQ5	
V11	Vert. Mult.	12AU7A	12AU7A	12AU7 may be used.
V12	Vert. Output	6V6GT	6V6GT	
V13	Horiz. AFC	6AL5	6AL5	
V14	Horiz. Mult.	12AU7A	12AU7A	
V15	Horiz. Output	6CU6	6CU6	
V16	Damper	6AX4GT	6AX4GT	
V17	HV Rectifier	1B3GT	1B3GT	
V18	LV Rectifier	5U4GB	5U4GB	5U4G or 5U4GA may be used.

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Setchell-Carlson PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V19	17AVP4A ①	17AVP4A ①		17AVP4A ② 17AVP4	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: Setchell-Carlson PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▪40	350	C-101				TM-806060-350	Q-012	TVL-3642
B	▪120	350					TD-40-350	MT-4540	TVA-1611
C	40	350							
C2	5	150		PRS150V4	BR415	TC40	TD-4-150	FM-1504	TVA-1402
C3	100	50		PRS50V100	BRH501	TC3501	TD-100-50	MTH-5010	TVA-1310

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Setchell-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	5			NP0-DI5	TCZ-4R7	Z011	NP0A-050	ZT-555	5TCCB-V47	
C5	120			DI00012	DD-121	G044	811-121	UC-5312	5GA-T12	
C6	6.8			NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C7	6.8			NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C8	2-10				829-10					
C9	800									
C10	2.2			NP0-SI2.2	TCZ-2R2	Z006	NP0A-2R2		5TCCB-V22	
C11	.5-3				829-3		3115-01-0R5	CT565A		
C12	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C13	800									
C14	60									
C15	.5-3				829-3		3115-01-0R5	CT565A		
C16	1.5			NP0-SI1.5	TCZ-1R5	TZ04	NP0A-1R5	ZT-5515	5TCCB-V15	
C17	10									
C18	10									
C19	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C20	800									
C21	800									
C22	470			BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C23	3.3		C-105	NP0-SI3.3	TCZ-3R3	Z008	NP0A-3R3	ZT-5533	5TCCB-V33	
C24	1			NP0-SI1	TCZ-1	TZ03	NP0A-010		5TCCB-V1	
C25	20	500		NP0-SI20	TCZ-20	22R5Q2	NP0K-200	ZT-542	1FM-42	
C26	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C27	.47	200		P288N-47		CUB2P47		PT4047	2TM-P47	
C28	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C29	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C30	1		C-104	NP0-SI1	TCZ-1	TZ03	NP0A-010		5TCCB-V1	
C31	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C32	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C33	.82		C-103							
C34	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C35	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C36	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C37	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C38	1			NP0-SI1	TCZ-1	TZ03	NP0A-010		5TCCB-V1	
C39	3.3			NP0-SI3.3	TCZ-3R3	Z008	NP0A-3R3	ZT-5533	5TCCB-V33	
C40	20	500		NP0-SI20	D6-200	22R5Q2	GP1K-200	UC-5422	1FM-42	Note 4
C41	20	500		NP0-SI20	D6-200	22R5Q2	GP1K-200	UC-5422	1FM-42	Note 4
C42	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C43	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C44	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C45	.0047	400		BPD-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C46	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C47	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C48	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C49	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C50	270	500		NP0-SI270	D6-271	5W5T27	GP2K-271	UC-5327	1FM-327	
C51	.22	400		P488N-22		CUB4P22		PT4022	4TM-P22	Note 1
C52	.22	400		P488N-22		CUB4P22		PT4022	4TM-P22	
C53	.0027	400		DI0027	D6-272	1W5D27	GP2-333-272	UC-5227	1FM-227	
C54	.0047	400		BPD-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C55	.0047	400		BPD-0047	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C56	.01	400		BPD-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C57	.0047	400		BPD-0047	D6-472	GUB6D47	GP2-333-472	PT6247	6TM-D47	
C58	.22	400		P488N-22		CUB4P22		PT4022	4TM-P22	
C59	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C60	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	Note 3
C61	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C62	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C63	910	500		1464-00091	D6-102	1W5T91	811-911	MC-255	MS-391	
C64	910	500		1464-00091	D6-102	1W5T91	811-911	MC-255	MS-391	
C65	.01	400		BPD-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C66	.0027	400		DI0027	D6-272	1W5D27	GP2-333-272	UC-5227	1FM-227	
C67	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C68	270	500		NP0-SI270	TCZ-270	5R5T27	NP0-335-271	MCE241	MS-327	
C69	270	500	C-102	NP0-SI270	TCZ-270	5R5T27	NP0-335-271	MCE241	MS-327	

PARTS LIST AI
CAPAC

ITEM No.	RATING: CAP.	RATING: VOLT	Setchell-Carlson PART No.	AEROVOX PART No.	CENTRA PART
C70	680	500		1464-00068	D6-68
C71	.0027	400		DI0027	D6-27
C72	.1	400		P488N-1	DF-10
C73	.1	400		P488N-1	DF-10
C74	.047	400		BPD-05	DF-5
C75	.0047	400		BPD-0047	D6-47
C76	680	500		1464-00068	D6-68
C77	100	2000	C-100	HVD-30-100	DD30-
C78	1000			BPD-001	DD-10

Note 1. Some versions use .1MFD in this application.
Note 2. Some versions use .22MFD in this application.
Note 3. Not used in some versions.
Note 4. Some versions use 10MMF in this application.

CON

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEME: Setchell-Carlson PART No.	CENTRALAB PART No.	CLARC PART
R1A	500KΩ	½	808	AB-60	A47-5
B	Shaft		Not Req.	AK-3	FS-3
C	Switch		Not Req.	KB-1	SWE-
R2A	500Ω	½	809	B-4	A47-5
B	Shaft		Not Req.	Not Req.	FS-3
R3A	2Meg	½	803	BX-75	A47-2
B	Shaft		Not Req.	Not Req.	FKS-1
R4A	2Meg	½	803	BX-75	A47-2
B	Shaft		Not Req.	Not Req.	FKS-1
R5A	2Meg	½	803	BX-75	A47-2
B	Shaft		Not Req.	Not Req.	FKS-1
R6A	2Meg	½	803	BX-75	A47-2
B	Shaft		Not Req.	Not Req.	FKS-1
R7A	100KΩ	½	802	BX-40	A47-1
B	Shaft		Not Req.	Not Req.	FKS-1

RESI

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Setchell-Carlson PART No.	IRC PART No.	NOTES
R8	680KΩ	½			
R9	4700Ω	½		BTS-4700	
R10	470KΩ	½		BTS-470K	
R11	820KΩ	½		BTS-280K	
R12	3900Ω	½		BTS-3900	
R13	10KΩ	½		BTS-10K	
R14	220KΩ	½		BTS-220K	
R15	10KΩ	½			
R16	47KΩ	½		BTS-47K	
R17	15KΩ	½		BTS-15K	
R18	22KΩ	½			
R19	18KΩ	2		BTB-18K	
R20	1200Ω	½		BTS-1200	
R21	470KΩ	½		BTS-470K	
R22	47KΩ	½		BTS-47K	
R23	6800Ω	½			
R24	100KΩ	½			
R25	470Ω	½		BTS-470	
R26	5600Ω	½			
R27	2700Ω	½		BTS-2700	
R28	150Ω	½		BTS-150	
R29	5600Ω	½			
R30	47KΩ	½			
R31	470Ω	½		BTS-470	
R32	150Ω	½		BTS-150	
R33	3900Ω	½		BTS-3900	
R34	47KΩ	½		BTS-47K	Note 1
R35	10KΩ	1		BTA-10K	
R36	150Ω	½		BTS-150	
R37	150Ω	½		BTS-150	
R38	47KΩ	½		BTS-47K	
R39	4.7Meg	½		BTS-4.7Meg	
R40	470KΩ	½		BTS-470K	
R41	15KΩ	½		BTS-15K	
R42	1Meg	½		BTS-1Meg	
R43	6800Ω	½		BTS-6800	
R44	270Ω	1		BTA-270	Note 2
R45	1Meg	½		BTS-1Meg	
R46	4700Ω	2		BTB-4700	
R47	3900Ω	½		BTS-3900	
R48	4.7Meg	½		BTS-4.7Meg	

Note 1. Some versions use a 1
Note 2. Some versions use a 2

TRANSFORM

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	Setchell-Ca PART N
T1	117VAC ③1.46A	540VCT .220ADC	5VAC ③3A	6.3VAC ③8.4A	T-100

① Drill one new mounting hole.

TRANSFORMERS

ITEM No.	USE	Setchell-Carlson PART No.	Halldorson PART No.	M PAR
T2	Horiz. Output Trans.	T-103	FB420 & RF800 *①	HVO
T3	Vert. Output Trans.	T-101	Z1900 ②	
T4A	Yoke(90°) Horiz.(20MH)	Y-100	DF607 ④⑤	MDF
B	Vert. (40MH)	Y-101 ③		

① Drill new mounting hole(s).
② Connect terminal #2 to terminal #3; connect terminal # V12; connect jumpered terminals #2 and #3 to screen (lead of yoke; terminal #12 to red lead of yoke (B+).
③ Yoke rear cover and centering device; not supplied with
④ Use original rear cover and centering device.
⑤ Connect horizontal damping network across terminals #

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	REPLACEMENT DATA: Setchell-Carlson PART No.	STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6DQ7A	6DQ7A	
V2	Mixer-Oscillator	6A7S	6A7S	
V3	1st. Video IF Amplifier	6BA6	6BA6	
V4	2nd. Video IF Amplifier	6AU6	6AU6	
V5	3rd. Video IF Amplifier	6AU6	6AU6	
V6	Video Output-Sync Sep.	6AU6	6AU6	
V7	AGC Keying-Sync Phase Inverter	6AU6	6AU6	
V8	Sound IF Amplifier	6AU6	6AU6	
V9	Ratio Detector-AF Amp.-AGC Clamper	6T8	6T8	
V10	Audio Output	6AQ6	6AQ6	
V11	Vert. Mult.	12AU7A	12AU7A	12AUT may be used.
V12	Vert. Output	6V6GT	6V6GT	
V13	Horiz. AFC	6AL5	6AL5	
V14	Horiz. Mult.	12AU7A	12AU7A	
V15	Horiz. Output	6CU5	6CU5	
V16	Damper	6AX4GT	6AX4GT	
V17	HV Rectifier	1B3GT	1B3GT	
V18	LV Rectifier	5U4GB	5U4G	5U4G or 5U4GA may be used.

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: Setchell-Carlson PART No	CRS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V19	17AVP4A ①	17AVP4A ①		17AVP4A ② ③ Aluminized 17AVP4 ② Silver screen "98"	

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP.	VOLT	REPLACEMENT DATA: Setchell-Carlson PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	@40	350	C-101				TM-5060@50-350	Q-Q12	TVL-3042
B	@120	350					TD-40-350	MT-4540	TVA-1611
C	40	350							
C2	1	150		PRS150V4	BR415	TC40	TD-A-150	FM-1504	TVA-1402
C3	100	50		PRS50V100	BRS1501	TC2301	TD-100-50	MTH-5010	TVA-1310

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: Setchell-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	5			MPG-D15	TCZ-5R7	Z01J	MPGA-050	ZT-5S5	5TCCB-V47	
C5	130			D20G02	CD-5S13	G044	811-5S1	UC-5S13	5GA-T78	
C6	6.8			MPG-D16.8	TCZ-6R8	Z01J	MPGA-6R8	ZT-5S68	5TCCB-V68	
C7	6.8			MPG-D16.8	TCZ-6R8	Z01J	MPGA-6R8	ZT-5S68	5TCCB-V68	
C8	9-10				539-3					
C9	300									
C10	3.3			MPG-S13.3	TCZ-3R3	Z006	MPGA-3R3		5TCCB-Y22	
C11	5-8				539-3		3115-01-0R5	CT56SA		
C12	1000			RPD-001	DD-103	K069	801-001	DC-S31	5HK-D1	
C13	500									
C14	60									
C15	5-8				539-3		3115-01-0R5	CT56SA		
C16	1.5			MPG-S1.5	TCZ-1R5	TZ04	MPGA-1R5	ZT-5S15	5TCCB-V15	
C17	10									
C18	100									
C19	1000			RPD-001	DD-103	K069	801-001	DC-S31	5HK-D1	
C20	500									
C21	800									
C22	470			RPD-0047	DD-471	K069	811-471	UC-5347	5GA-T47	
C23	3.3		C-306	MPG-S13.3	TCZ-3R3	Z006	MPGA-3R3	ZT-5S33	5TCCB-V33	
C24	1.			MPG-S11	TCZ-1	TZ03	MPGA-010		5TCCB-V1	
C25	30	500		MPG-S130	TCZ-30	Z25Q2	MPGK-300	ZT-5A3	1FM-43	
C26	1000			RPD-001	DD-103	K069	801-001	DC-S31	5HK-D1	
C27	.47	200		P34SN-47		CUB2P47		PT4S47	3TM-D47	
C28	1000			RPD-001	DD-103	K069	801-001	DC-S31	5HK-D1	
C29	1000			RPD-001	DD-103	K069	801-001	DC-S31	5HK-D1	
C30	1		C-104	MPG-S11	TCZ-1	TZ03	MPGA-010		5TCCB-V1	
C31	1000			RPD-001	DD-103	K069	801-001	DC-S31	5HK-D1	
C32	1000			RPD-001	DD-103	K069	801-001	DC-S31	5HK-D1	
C33	.33		C-309							
C34	1000			RPD-001	DD-103	K069	801-001	DC-S31	5HK-D1	
C35	1000			RPD-001	DD-103	K069	801-001	DC-S31	5HK-D1	
C36	1000			RPD-001	DD-102	K069	801-001	DC-S31	5HK-D1	
C37	1000			RPD-001	DD-103	K069	801-001	DC-S31	5HK-D1	
C38	1			MPG-S11	TCZ-1	TZ03	MPGA-010		5TCCB-V1	
C39	3.3			MPG-S13.3	TCZ-3R3	Z006	MPGA-3R3	ZT-5S33	5TCCB-V33	
C40	20	500		MPG-S120	D6-200	32H523	GPSK-200	UC-5423	1FM-43	Note 4
C41	20	500		MPG-S120	D6-200	32H524	GPIK-200	UC-5422	1FM-43	Note 4
C42	10000			RPD-01	DD-103	K083	811-01	DC-S11	5HK-E1	
C43	10000			RPD-01	DD-103	K083	811-01	DC-S11	5HK-E1	
C44	1000			RPD-001	DD-103	K069	801-001	DC-S21	5HK-D1	
C45	.0047	400		RPD-0047	D6-472	CUB6D47	GPJ-333-472	PT6S47	6TM-D47	
C46	10000			RPD-01	DD-103	K083	811-01	DC-S11	5HK-E1	
C47	10000			RPD-01	DD-103	K083	811-01	DC-S11	5HK-E1	
C48	10000			RPD-01	DD-103	K083	811-01	DC-S11	5HK-E1	
C49	10000			RPD-01	DD-103	K083	811-01	DC-S11	5HK-E1	
C50	270	500		MPG-S1270	D6-271	SW5Z27	GPZK-271	UC-5327	1FM-527	
C51	.33	400		P34SN-33		CUB4P33		PT4033	4TM-P33	Note 1
C52	.33	400		P34SN-S2		CUB4P22		PT4022	4TM-P22	
C53	.0027	600		D20G27	D6-272	IW5Z27	GP3-333-272	UC-5327	1FM-527	
C54	.0047	400		RPD-0047	D6-472	CUB6D47	GP3-333-472	PT6S47	6TM-D47	
C55	.0047	400		RPD-0047	D6-472	CUB6D47	GP3-333-472	PT6S47	6TM-D47	
C56	.047	400		RPD-047	D6-473	CUB6P47	GP3-333-473	PT6J47	6TM-P47	
C57	.0047	400		RPD-0047	D6-472	GUB6D47	GP3-333-472	PT6S47	6TM-D47	
C58	.22	400		P34SN-22		CUB4P22		PT4022	4TM-P22	
C59	.047	400		RPD-05	DP-503	CUB4S47		PT4J47	4TM-S47	Note 3
C60	.047	400		RPD-05	DP-503	CUB4S47		PT4J47	4TM-S47	
C61	.1	400		P48SN-1	DP-104	CUB4P1		PT4S1	4TM-P1	
C62	.1	400		RPD-01	DD-103	K083	811-01	DC-S11	5HK-E1	
C63	10000			1464-00091	D6-102	IW5Z01	811-S11	MC-S21	MS-391	
C64	910	500		1464-00091	D6-102	IW5Z91	811-911	MC-S55	MS-391	
C65	.01	600		RPD-01	D6-103	CUB4S1	GP3-333-103	PT4J1	4TM-S1	
C66	.0027	600		D20G27	D6-272	IW5Z27	GP3-333-272	UC-5327	1FM-527	
C67	.047	400		RPD-05	DP-503	CUB4S47		PT4J47	4TM-S47	
C68	270	500		MPG-S1270	TCZ-270	5HZ27	MPG-S35-271	MCE341	MS-327	
C69	270	500	C-108	MPG-S1270	TCZ-270	5HZ27	MPG-S35-271	MCE341	MS-327	

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	Setchell-Carlson PART No.	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C70	680	500			1464-00068	D6-681	1B5T68	811-681	MS-368	
C71	.0027	600			D10G27	D6-272	1WSD27	GP3-333-272	UC-5327	
C72	.1	400			P48SN-1	DP-104	CUB4P1		PT4S1	Note 2
C73	.1	400			P48SN-1	DP-104	CUB4P1		PT4S1	
C74	.047	400			BPD-05	DP-503	CUB4S47	GP3-333-472	PT6S47	4TM-S47
C75	.0047	400			BPD-0047	D6-472	CUB6D47		PT6S47	6TM-D47
C76	.0047	600			1464-00068	D6-681	1B5T68	811-681	UC-5368	MS-368
C77	100	2000	C-100		D20-001	DD-102	K069	2H-001	20GA-T1	5HK-D1
C78	1000	500			BPD-001	DD-102	K069	801-001	DC-S21	5HK-D1

Note 1. Some versions use .1MFD in this application.
Note 2. Some versions use .22MFD in this application.
Note 3. Not used in some versions.
Note 4. Some versions use 10MMF in this application.

CONTROLS

ITEM No.	RATING: RESIST. ANCE	WATTS	Setchell-Carlson PART No.	REPLACEMENT DATA: CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	½		S08	A45-50	A45-500K-Z	Q13-135	U-48	Volume
B	Shaft			Not Req.	AK-2	FS-2	Not Req.	U-48	Attach to R1A.
C	Switch			Not Req.	KB-1	SWZ-12	T6-1	U5-38	Attach to R1A.
R2A	500Ω	½		S09	B-4	A47-500-S	Q11-103	U-2	Contrast
B	Shaft			Not Req.	Not Req.	FS-2	Not Req.	Not Req.	Attach to R2A.
R3A	2Meg	½		S01	BX-75	A47-2M-sg-d	Q11-139	TA3EL	Vertical Hold
B	Shaft			Not Req.	Not Req.	FS2-1/4	SQ	Not Req.	Attach to R3A.
R4A	2Meg	½		S03	BX-75	A47-2Meg-S	Q11-139	TA3EL	Height-Bottom
B	Shaft			Not Req.	Not Req.	FS2-1/4	SQ	Not Req.	Attach to R4A.
R5A	2Meg	½		S03	BX-75	A47-2Meg-S	Q11-139	TA3EL	Height-Top
B	Shaft			Not Req.	Not Req.	FS2-1/4	SQ	Not Req.	Attach to R5A.
R6A	2Meg	½		S03	BX-75	A47-2Meg-d	Q11-139	TA3EL	Brightness
B	Shaft			Not Req.	Not Req.	FS2-1/4	SQ	Not Req.	Attach to R6A.
R7A	100KΩ	½		S03	BX-49	A47-100K-S	Q11-131	Horizontal Hold	Attach to R7A.
B	Shaft			Not Req.	Not Req.	FS2-1/4	SQ	Not Req.	

RESISTORS

ITEM No.	RATING: OHMS	WATT	Setchell-Carlson PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R8	680KΩ	½		BTS-4700	
R9	470KΩ	½		BTS-470K	
R10	470KΩ	½		BTS-S82K	
R11	820KΩ	½		BTS-S82K	
R12	390KΩ	½		BTS-3900	
R13	10KΩ	½		BTS-10K	
R14	220KΩ	½		BTS-220K	
R15	10KΩ	½		BTS-10K	
R16	47KΩ	½		BTS-47K	
R17	15KΩ	½		BTS-15K	
R18	22KΩ	½		BTS-15K	
R19	18KΩ	3		BTB-18K	
R20	1300Ω	½		BTS-1300	
R21	470KΩ	½		BTS-470K	
R22	47KΩ	½		BTS-47K	
R23	6800Ω	½			
R24	100KΩ	½			
R25	470Ω	½		BTS-470	
R26	5600Ω	½			
R27	3700Ω	½		BTS-3700	
R28	150Ω	½		BTS-150	
R29	5600Ω	½			
R30	47KΩ	½			
R31	47Ω	½		BTS-470	
R32	150Ω	½		BTS-150	
R33	3900Ω	½		BTS-3900	
R34	47KΩ	½		BTS-47K	Note 1
R35	10KΩ	½		BTA-10K	
R36	150Ω	½		BTS-150	
R37	150Ω	½		BTS-150	
R38	47KΩ	½		BTS-47K	
R39	4.7Meg	½		BTS-4.7Meg	
R40	470KΩ	½		BTS-470K	
R41	15KΩ	½		BTS-15K	
R42	1Meg	½		BTS-1Meg	
R43	6800Ω	½		BTS-6800	
R44	270Ω	1		BTA-270	Note 2
R45	1Meg	½		BTS-1Meg	
R46	4700Ω	3		BTB-4700	
R47	3900Ω	½		BTS-3900	
R48	4.7Meg	½		BTS-4.7Meg	

ITEM No.	RATING: OHMS	WATT	Setchell-Carlson PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R49	230K	½		BTS-230K	
R50	6800Ω	½		BTS-6800	
R51	27KΩ	2		BTB-27K	
R52	47KΩ	3		BTB-47K	
R53	100KΩ	½		BTS-100K	
R54	220KΩ	½		BTS-220K	
R55	4.7Meg	½		BTS-4.7Meg	
R56	47KΩ	½		BTS-47K	
R57	230KΩ	½		BTS-230K	
R58	4.7Meg	½		BTS-4.7Meg	
R59	33KΩ	½		BTS-33K	
R60	6800Ω	½		BTS-6800	
R61	22KΩ	½		BTS-22K	
R62	5600Ω	½		BTS-5600	
R63	230KΩ	½		BTS-230K	
R64	4700Ω	½		BTS-4700	
R65	470KΩ	½		BTS-470K	
R66	1Meg	½		BTS-1Meg	
R67	3900Ω	½		BTS-3900	
R68	100KΩ	½		BTS-100K	
R69	4.7Meg	½		BTS-4.7Meg	
R70	47KΩ	½		BTS-47K	
R71	230KΩ	½		BTS-230K	
R72	150Ω	½		BTA-1500	
R73	560Ω	½			
R74	56Ω	½			
R75	2000Ω	3		PW7-3000	
R76	220KΩ	½		BTS-230K	
R77	220KΩ	2			
R78	18KΩ	2			
R79	2.2Meg	½			
R80	4.7Meg	½			
R81	27KΩ	3			
R82	120KΩ	½		BTS-120K	
R83	100KΩ	½			
R84	680Ω	½		BTS-S20	
R85	6300Ω	½			
R86	2.2Meg	½			
R87	82Ω	½			
R88	30KΩ	½	R-101	2D-50K	
R89	22KΩ	½			

Note 1. Some versions use a 1Meg 1W resistor in this application.
Note 2. Some versions use a 250Ω 1W resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	Setchell-Carlson PART No.	REPLACEMENT DATA: Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC	540VCT	5VAC	6.3VAC	T-102					
	②1.46A	220ADC	②3A	②6.4A						

① Drill one new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	Setchell-Carlson PART No.	REPLACEMENT DATA: Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	T-103	FH-20 & HVO-38 *			XO98 * 1	A-8254 *	FLY-75 *	D-49 *1
			RF800 * 1						
T3	Vert. Output Trans.	T-101	21W00 ②				DY-18A ③	Y-16 ③	Y-41-1 ③
T4A	Yoke(90°)Horiz.(20Mh	Y-390	DF607 ③	MDF-82 ③	238DI ③				
B	Vert.(40MH)	Y-151 ③							

① Drill new mounting hole(s).
② Connect terminal #2 to terminal #3; connect terminal #4 to terminal #5; then connect terminal #1 to plate (Pin #3) of V12; connect jumpered terminals #2 and #3 to screen (Pin #4) of V12. Connect jumpered terminals #4 and #5 to green lead of yoke; terminal #13 to red lead of yoke (B+).
③ Yoke rear cover and centering device; not supplied with yoke.
④ Use original rear cover and centering device.
⑤ Connect horizontal damping network across terminals #3 and #7. Use original if necessary.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
5	5	5		1	5	5	5
4	4	4		3	4	4	4
3	3	4		3	4	4	3
2	2	4		3	4	4	3
1	1	3		4	3	3	2
6	Term. #2 of RF800	2		5	2	2	3
7	Term. #1 of RF800	1		6	1	1	4
Connect Width Coil Across	Terms. #3 & #4 of RF800 Across 3 & 2						
Special Notes:	⑤	⑦					

② To increase width, and reduce yoke "ringing", remove capacitor C75; add capacity (approximately 50 to 100MMF ②) 3KV) across horizontal yoke.
③ If the picture is out of phase, reverse width coil primary or secondary.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC	Setchell-Carlson PART No.	REPLACEMENT DATA: Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	5.1KΩ	3Ω	T102	Z1001	A-2630	A-2670	24S51	S-3X	

SPEAKER

ITEM No.	USE	RATINGS: SIZE	FIELD	V. C. IMP	Setchell-Carlson PART No.	REPLACEMENT DATA: QUAM PART No	RCA TYPE No	NOTES
SP1		6"	PM	3Ω	55-61	6A1	229S1	

COILS (RF-IF)

ITEM No	USE	DC RES.: PRI.	SEC.	Setchell-Carlson PART No.	REPLACEMENT DATA: MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω					
L2	Ant. Matching Trans.	0Ω	0Ω					
L3	IF Trap	0Ω						
L4	FM Trap	0Ω						
L5A	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 6
F	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 7
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 12
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω			Z-106			Channel 13
L6	Neut. Coil	0Ω						
L7	RF Coil	0Ω						
L8	Conv. Plate	1Ω						
L9	1st Video IF	0Ω			B-305	17-5003 *	TV-138 *	6233 * Includes 44.25MC Trap
L10	2nd Video IF	0Ω	0Ω		B-300	17-5003 *	TV-138 *	6233 *
L11	3rd Video IF	0Ω	0Ω			17-5003 *	TV-138 *	6233 *
L12	4th Video IF	0Ω	0Ω			17-5003 *	TV-138 *	6233*
L13	Series Peaking Coil	14Ω			D-300	19-4350	TV-187	6173 225 Microhenries, Wound on 22KΩ resistor
L14	Shunt Peaking Coil	17Ω			D-301	19-2300 ▲	TV-190 ▲	6156 ▲ 300 Microhenries, Wound on 22KΩ resistor
L15	Sound IF	7Ω			C4501-C	30-1005	TV-181	1473
L16	Ratio Det.	8Ω		L50CT	C4503	17-1407	TV-115	6206 Tertiary Winding- 7Ω
L17A	Line Choke	0Ω						
B	Line Choke	0Ω						

* Cut out chassis hole and use adaptor plate and use one winding.
▲ Cut out chassis hole and use adaptor plate and detune trap.
▲ Parallel with 22KΩ resistor.

FILTER CHOKE

ITEM No	RATINGS: TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE @ CURRENT 1000 (~)	Setchell-Carlson PART No.	REPLACEMENT DATA: Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L18	220ADC	82Ω	2.46HY	L-100		C-2891 ①	C-2534 ①		C-31X

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

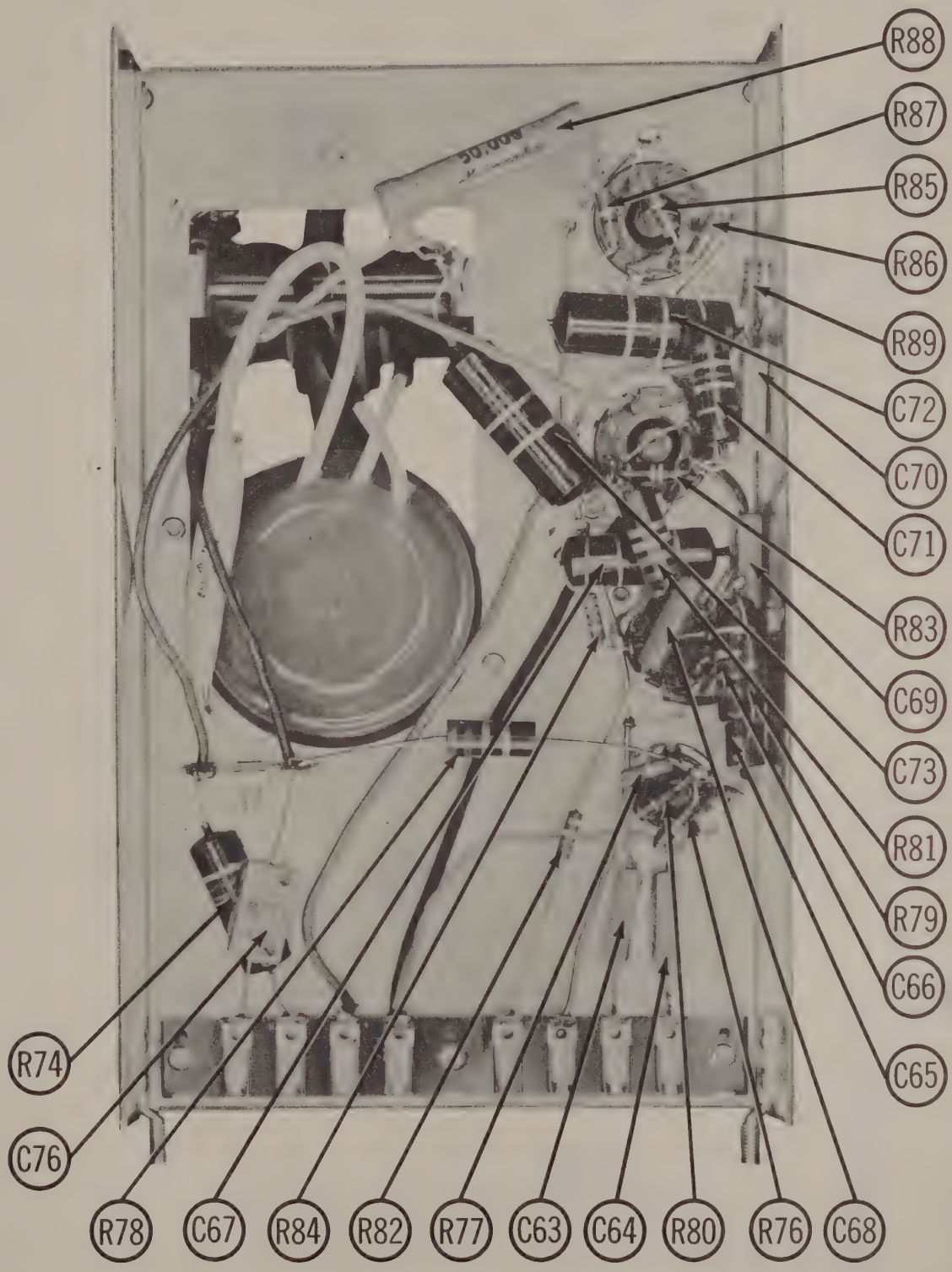
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Setchell-Carlson PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	2A 250V		F-100	312002. (3AG2A)	342008	AGC2	HKP

CRYSTAL DIODES

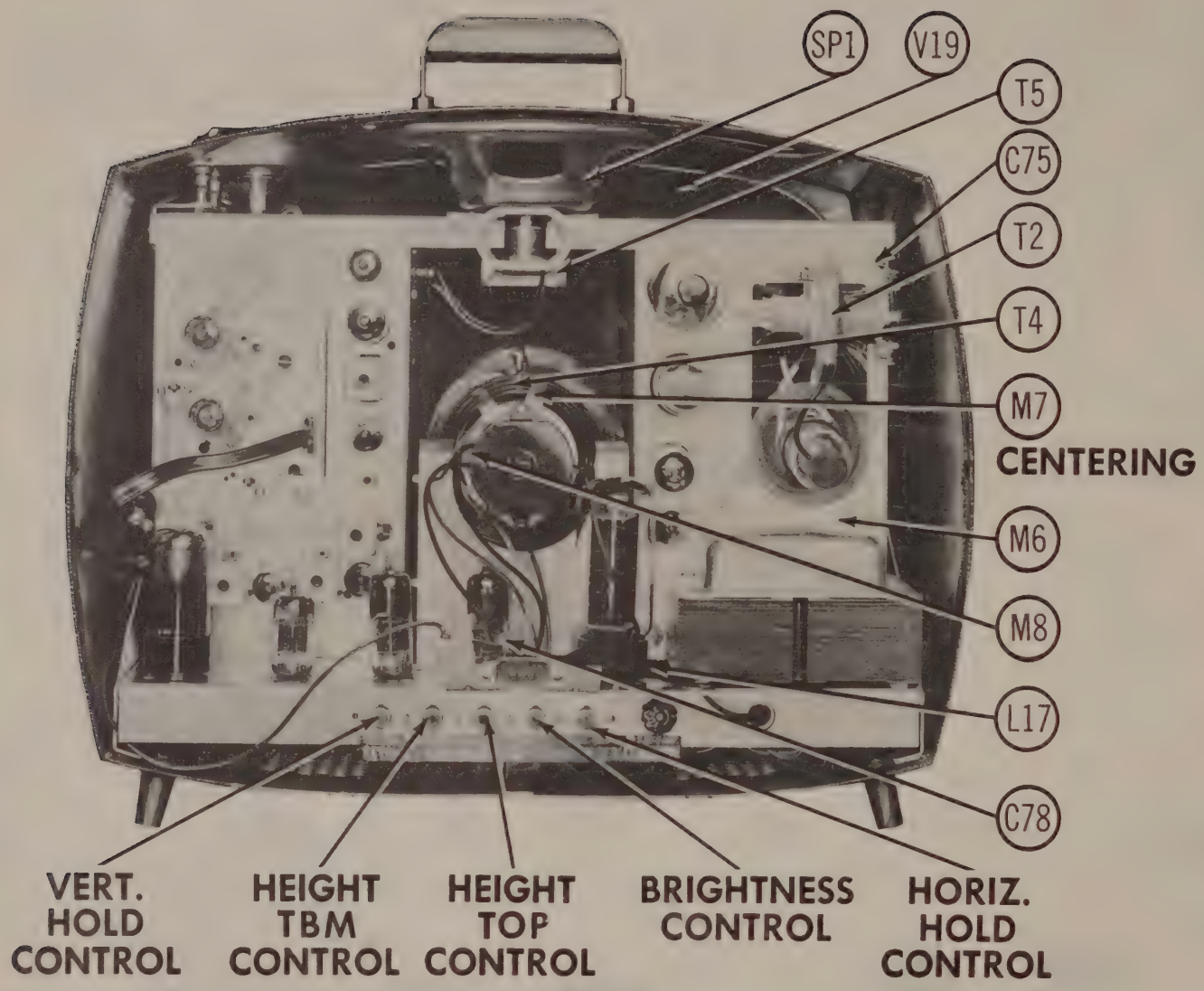
ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		Setchell-Carlson PART No.	SYLVANIA PART No.	
M2	1N60		1N60	Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	Setchell-Carlson PART No.	NOTES
M3	Dial Light		#44
M4	Tuner	Z-100	VHF
M5	Tuner, Video IF, & Audio Unit Chassis	Z-101	ABC-1 Unit Complete
M6	Horiz. Sweep Unit Chassis.	N-102	DF-1 Unit Complete
M7	Centering Device	Y-101	Includes Deflection Yoke (T4) Rear Cover
M8	Ion Trap		
	Cabinet	Z-104	Includes Speaker Grille & Handle; Less Front & Back
	Handle	H-106	Specify Color
	Knob	K-100	Channel Selector
	Knob	K-102	On-Off-Volume & Contrast
	Knob	K-101	Fine Tuning
	Safety Glass	G-100	



HV SUB-CHASSIS BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station. Adjust the horizontal hold control to synchronize the picture horizontally. If the control must be turned to either extreme to sync in the picture, or if slow warm-up causes the horizontal frequency to drift, replace V14 (12AU7A).

PHOTOFACT* Folder

*TRADE MARK

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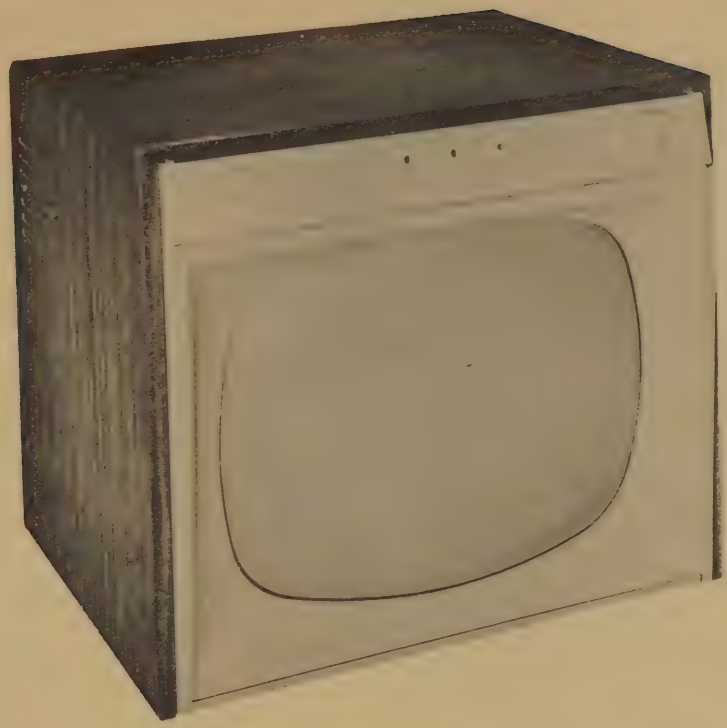

WESTINGHOUSE MODEL H-934T21 (Ch. V-2342-24)

TRADE NAME	Westinghouse	MODELS	CHASSIS
		H-934T21, H-935T21, H-938K21, H-939K21, H-941K21, H-942K21	V-2342-14, -24, -34, -44
		H-950T24, H-951T24, H-954K24, H-955K24, H-956K24	V-2343-14, -24, -34, -44
		H-934TU21, H-935TU21, H-938KU21, H-939KU21, H-941KU21, H-942KU21	V-2352-104, -204, -304, -404
		H-950TU24, H-951TU24, H-954KU24, H-955KU24, H-956KU24	V-2353-104, -204, -304, -404

MANUFACTURER Westinghouse Electric Corp., Television & Radio Div., Metuchen, N.J.
TYPE SET Television Receiver
TUBES Seventeen
POWER SUPPLY 110-120 Volts AC-60 Cycle RATING 1.4 Amp. @ 117 Volts AC
TUNING RANGE Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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WESTINGHOUSE MODELS H-934T21, H-934TU21, H-935T21, H-935TU21, H-938K21, H-938KU21, H-939K21, H-939KU21, H-941K21, H-941KU21, H-942K21, H-942KU21, H-950T24, H-950TU24, H-951T24, H-951TU24, H-954K24, H-954KU24, H-955K24, H-955KU24, H-956K24, H-956KU24 (Ch. V-2342-14, -24, -34, -44, V-2343-14, -24, -34, -44, V-2352-104, -204, -304, -404, V-2353-104, -204, -304, -404)

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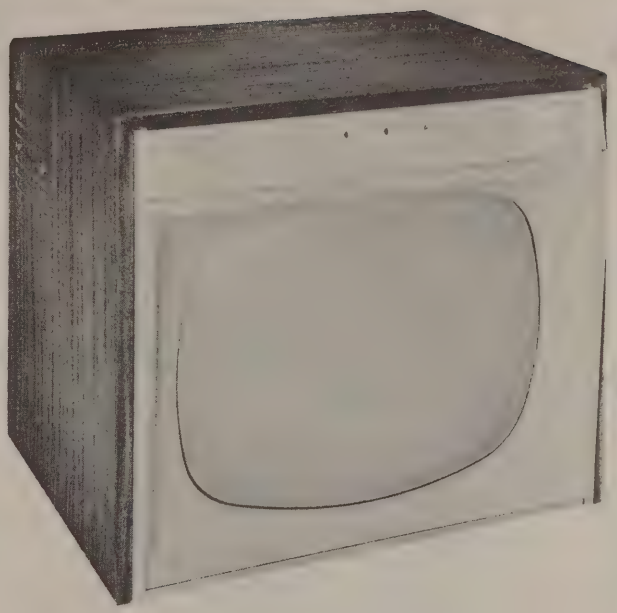
WESTINGHOUSE MODELS H-934T21, H-934TU21, H-935T21, H-935TU21, H-938K21, H-938KU21, H-939K21, H-939KU21, H-941K21, H-941KU21, H-942K21, H-942KU21, H-950T24, H-950TU24, H-951T24, H-951TU24, H-954K24, H-954KU24, H-955K24, H-955KU24, H-956K24, H-956KU24 (Ch. V-2342-14, -24, -34, -44, V-2343-14, -24, -34, -44, V-2352-104, -204, -304, -404, V-2353-104, -204, -304, -404)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.
2. Remove 2 metal screws holding control panel trim.
3. Remove 5 metal screws holding front of chassis to cabinet.
4. Remove 3 metal screws. Remove rear cover.
5. Remove 1 metal screw. Remove antenna terminal bracket.
6. Disconnect speaker leads.
7. Remove 6 chassis bolts. Remove chassis.
8. Remove 2 speaker nuts. Remove speaker.



CHASSIS

V-2342-14, -24, -34, -44,
V-2343-14, -24, -34, -44,
V-2352-104, -204, -304, -404,
V-2353-104, -204, -304, -404

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of VHF tuner oscillator adjustments, it is necessary to remove the chassis from the cabinet. (See disassembly instructions).

PICTURE TUBE SAFETY GLASS CLEANING

Remove 7 knobs, and remove 2 metal screws holding name plate and remove 1 metal screw at top of each side of trims. Remove both trims. Remove 3 metal screws holding strip at top of glass and lift glass up and out. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

SPECIAL ADJUSTMENTS - Sync Control Adjustment

Tune in the strongest available TV station, Turn the sync control (R6) clockwise until the picture begins to show signs of overload, or if signal is weak until the snow becomes pronounced. Turn the control counter clockwise until the snow is minimum or evidence of overload disappears. Check all available channels for excessive snow or signs of overload.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the horizontal hold control (R2) at the center of its range and adjust the horizontal oscillator slug (B2) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the quieting control (R5) located on the rear apron of chassis for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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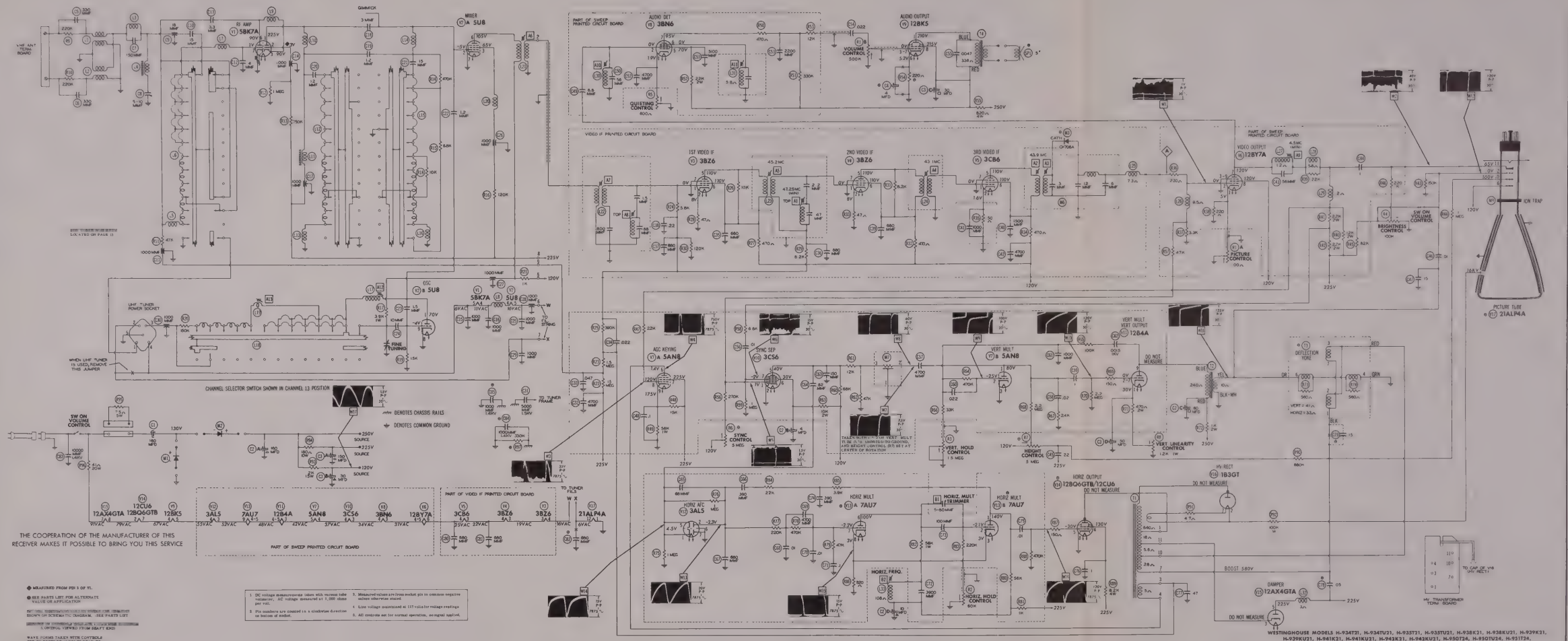
MIXER V2 A 5U8
RF AMP V1 5BK7A
OSC V2 B 5U8
1ST VIDEO IF V3 3BZ6
2ND VIDEO IF V4 3BZ6
3RD VIDEO IF V5 3CB6
AUDIO DET V8 3BN6
AUDIO OUTPUT V9 12BK5
VIDEO OUTPUT V10 12BY7A
AGC KEYING V7 A 5AN8
SYNC SEP V10 3CS6
VERT MULT V7 B 5AN8
VERT MULT VERT OUTPUT V11 12B4A
HORIZ AFC V12 3AL5
HORIZ MULT V13 A 7AU7
HORIZ MULT V13 B 7AU7
HORIZ OUTPUT V14 12BQ6GTB/12CU6
HV RECT V14 1B3GT
DAMPER V13 12AX4GTA
PICTURE TUBE V17 21ALP4A
V14 12AX4GTA 12BQ6GTB 12CU6
V15 12BK5
V12 3AL5
V13 7AU7
V11 12B4A
V7 5AN8
V10 3CS6
V8 3BN6
V6 12BY7A
V5 3CB6
V4 3BZ6
V2 3BZ6
V17 21ALP4A
SW ON VOLUME CONTROL
UHF TUNER POWER SOCKET
FINE TUNING
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
DENOTES CHASSIS RAILS
DENOTES COMMON GROUND
TO TUNER FRAME
TO TUNER FILS
PART OF SWEEP PRINTED CIRCUIT BOARD
PART OF VIDEO IF PRINTED CIRCUIT BOARD
VIDEO IF PRINTED CIRCUIT BOARD
VOLUME CONTROL 500K
QUIETING CONTROL 800Ω
BRIGHTNESS CONTROL 100K
SW ON VOLUME CONTROL
PICTURE CONTROL 1 MEG
SYNC CONTROL 5 MEG
VERT. HOLD CONTROL 1.5 MEG
HEIGHT CONTROL 5 MEG
VERT LINEARITY CONTROL 12K 1W
HORIZ HOLD CONTROL 60K
HORIZ FREQ
DEFLECTION YOKE
ION TRAP
DO NOT MEASURE
BOOST 580V
TO CAP OF V18 (HV RECT.)
HV TRANSFORMER TERM BOARD
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
MEASURED FROM PIN 5 OF V1.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
SHOWN ON SCHEMATIC DIAGRAM. SEE PARTS LIST
CONTROL, VIEWED FROM REAR OF CHASSIS
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 60 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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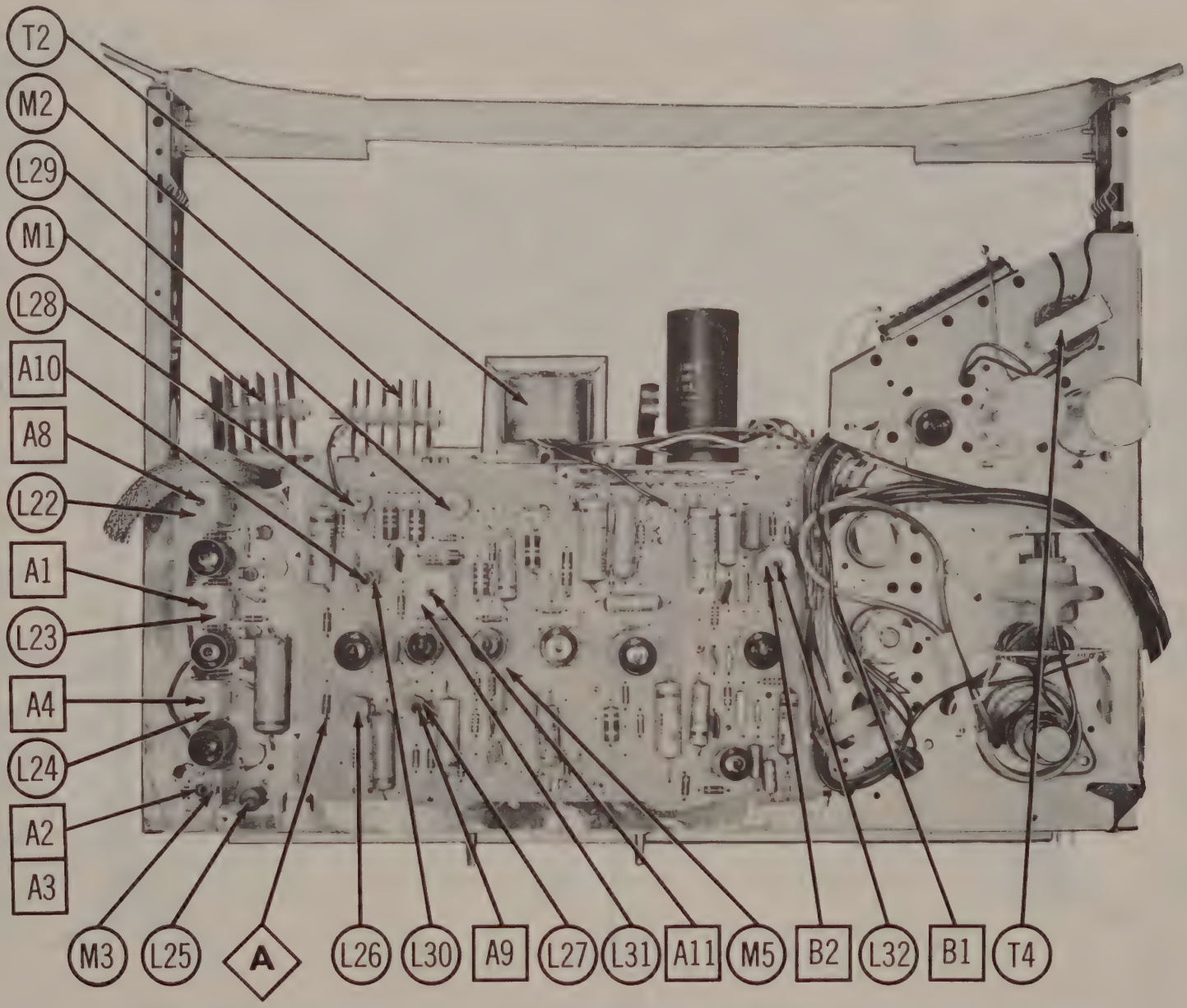
WESTINGHOUSE MODELS H-934T21, H-934TU21, H-933T21, H-933TU21, H-938K21, H-938KU21, H-939K21, H-939KU21, H-941K21, H-941KU21, H-942K31, H-943K31, H-943KU31, H-950T24, H-950TU24, H-951T24, H-951TU24, H-954K24, H-954KU24, H-955K24, H-955KU24, H-956K24, H-956KU24 (Ch. V-2342-14, -24, -34, -44, V-2343-14, -24, -34, -44, V-2353-104, -204, -304, -404, V-2353-104, -204, -304, -404)

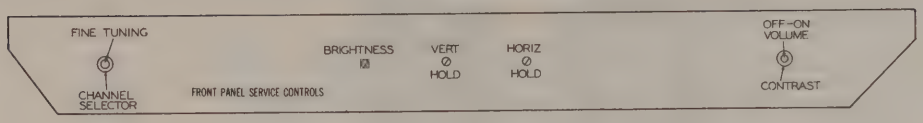
CHASSIS TOP VIEW CAPACITOR IDENTIFICATION

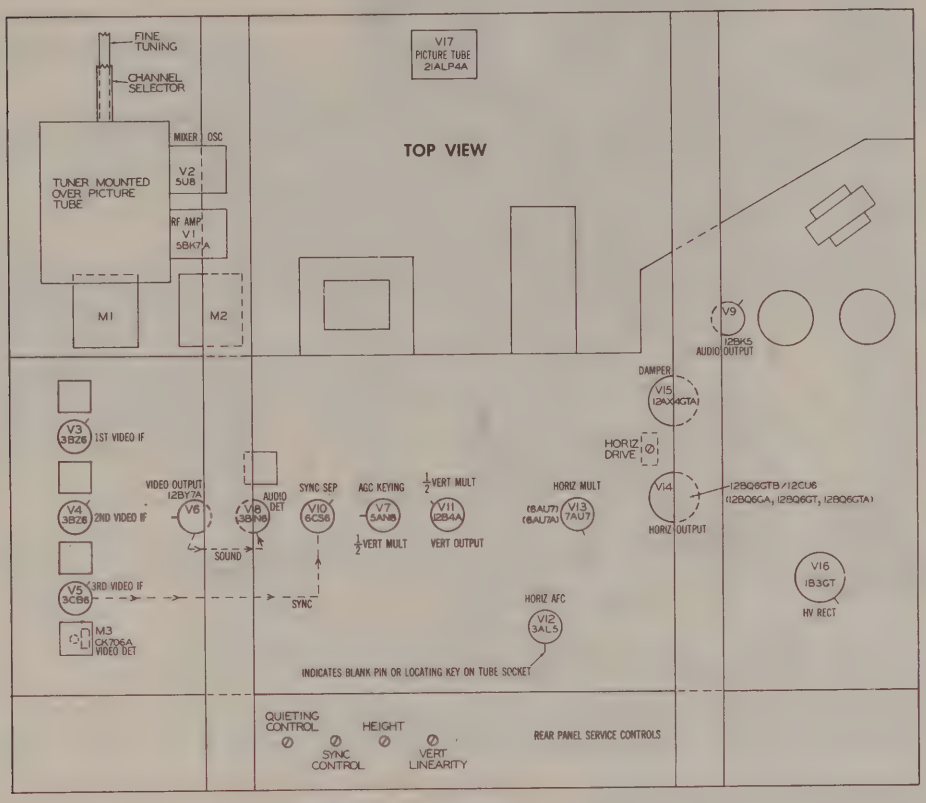
WESTINGHOUSE MODELS H-934T21, H-934TU21, H-935T21, H-935TU21, H-938K21, H-938KU21, H-939K21, H-939KU21, H-941K21, H-941KU21, H-942K21, H-942KU21, H-950T24, H-950TU24, H-951T24, H-951TU24, H-954K24, H-954KU24, H-955K24, H-955KU24, H-956K24, H-956KU24 (Ch. V-2342-14, -24, -34, -44, V-2343-14, -24, -34, -44, V-2352-104, -204, -304, -404, V-2353-104, -204, -304, -404)



CHASSIS TOP VIEW TRANS., INDUCTOR & ALIGN. IDENTIFICATION

TUBE PLACEMENT CHART





TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

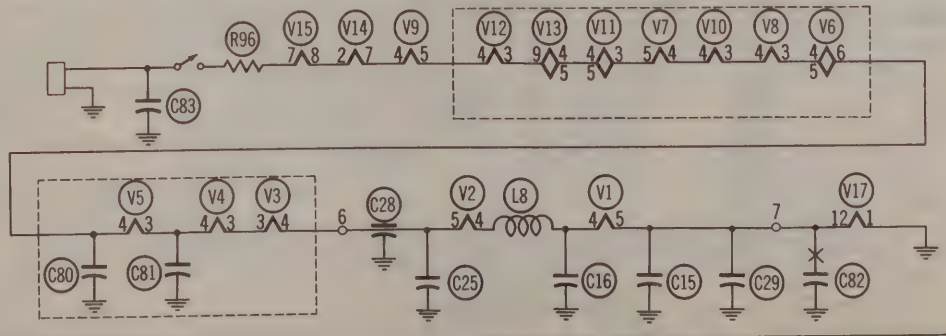
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V7, V17**
Has pic, no sound - **V8, V9**
Overloaded picture - **V7**

SYNC FAILURE
No vert. sync - **V7, V10, V11**
No horiz. sync - **V10, V12, V13**
No vert. or horiz. sync - **V10**

SWEEP FAILURE
No raster, has sound - **V13, V14, V15, V16, V17**
No vertical deflection - **V7, V11**
Poor vert. linearity or foldover - **V7, V11**
Poor horiz. linearity or foldover - **V13, V14, V15**
Narrow picture - **V13, V14, V15, V16, M1, M2**
Vert. off freq. - **V7, V10, V11**
Horiz. off freq. - **V10, V12, V13**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See circuit below).



WESTINGHOUSE MODELS H-934T21, H-934TU21, H-935T21, H-935TU21, H-938K21, H-938KU21, H-939K21, H-939KU21, H-941K21, H-941KU21, H-942K21, H-942KU21, H-950T24, H-950TU24, H-951T24, H-951TU24, H-954K24, H-954KU24, H-955K24, H-955KU24, H-956K24, H-956KU24 (Ch. V-2342-14, -24, -34, -44, V-2343-14, -24, -34, -44, V-2352-104, -204, -304, -404, V-2353-104, -204, -304, -404)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C77. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Connect a 470MMF capacitor across the vertical input terminals of the scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 1st. IF amplifier tube (V3). Low side to chassis.	Not used	47.25MC (Unmod)	Any non-interfering channel	USE VTVM DC probe to point Ⓐ. Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	"	43.9MC	"	"	A2, A3	Attenuate generator output for not more than 1 volt at VTVM. Adjust for maximum deflection.
3.	"	"	"	43.1MC	"	"	A4	"
4.	"	"	"	45.2MC	"	"	A5	"
5.	Fig. 2	Thru matching network (Fig. 2) to antenna terminals	213MC (10MC Swp)	41.25MC 42.25MC 43.0MC 45.0MC 45.75MC 47.25MC	13	Vert. Amp. thru 47KΩ to point Ⓐ. Low side to chassis.	A6, A7, A8	Use high scope gain and only enough sweep generator output for usable pattern on scope. Clip high side of marker generator to converter (ungrounded) tube shield. Leave low side disconnected. Set fine tuning control to its mid-range position. Adjust A6 for maximum amplitude and correct overall bandpass as shown in Fig. 1. Adjust A7 for correct tilt. Adjust A8 for MINIMUM marker amplitude at 41.25MC as in Fig. 1. If necessary, SLIGHTLY retouch A2 thru A5 for a symmetrical response similar to Fig. 1.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod)	Any unused channel	DC probe thru detector (Fig. 3) to pin 11 (cathode) of picture tube. Low side to chassis.	A9	Use high signal generator output. Adjust for MINIMUM deflection.

SOUND IF ALIGNMENT USING A TV SIGNAL

Tune in a TV station and connect an attenuator between the antenna and the receiver.
Set the quieting control (R5) to its mid-range position.
Adjust the quadrature coil (A11) for maximum sound. If two wider peaks occur use the one with the slug farthest counter clockwise.
If two closely spaced peaks occur, either the signal is not strong enough or the quieting control is not set properly.
Reduce the signal to its lowest usable level and adjust A10 and A11 for maximum sound. Apply a weak signal that allows noise to be heard in the speaker.
Adjust the quieting control (R5) for minimum noise. The point of minimum noise depends on the strength of the signal, therefore, the weakest possible signal should be used.
Do not leave R5 at its maximum counter clockwise position.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND OSCILLOSCOPE

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.001MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (15KC Swp)	4.5MC	Any unused channel	Vert. Amp. across volume control (R1B) Low side to chassis.	A11	Use strong signal from generator. Adjust A11 for maximum response at 4.5MC.
8.	"	"	"	"	"	"	A10, A11	Attenuate generator to give MINIMUM useful indication on scope. Adjust A10 and A11 for maximum output.
9.	"	"	Not used	4.5MC (30%, 400∿ Mod)	"	"	R5	Starting with a very low signal input gradually increase the level at the same time turning the quieting control (R5) back and forth until the signal reaches the point where the AM output reaches the point where the output on the scope dips to zero with a peak on each side. Set R5 for zero output at this signal level.

VHF OSCILLATOR ALIGNMENT

Set the fine tuning control to the center of its range. This is indicated by the flat surface of the shaft being up. Set the channel selector to the highest high band channel (7-13) station operating in the area. Adjust the high band oscillator adjustment (A12) for best picture detail.
Set the channel selector switch to the highest low band channel (2-6) operating in the area. Adjust the low band oscillator adjustment (A13) for best picture picture detail.
Recheck the setting of A12 and if it has changed repeat the entire procedure.

VHF RF AND MIXER ALIGNMENT

This portion of the tuner in this receiver has been properly aligned at the factory, and is very stable. Alignment of this portion should not be required in the field.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

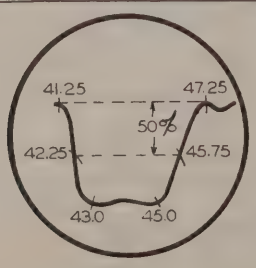
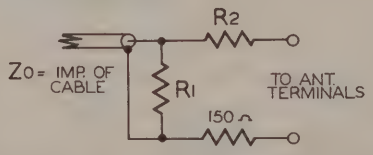


FIG. 1



Z0	R1	R2
50 Ω	56 Ω	120 Ω
75 Ω	82 Ω	116 Ω

FIG. 2

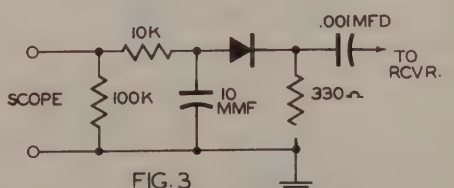
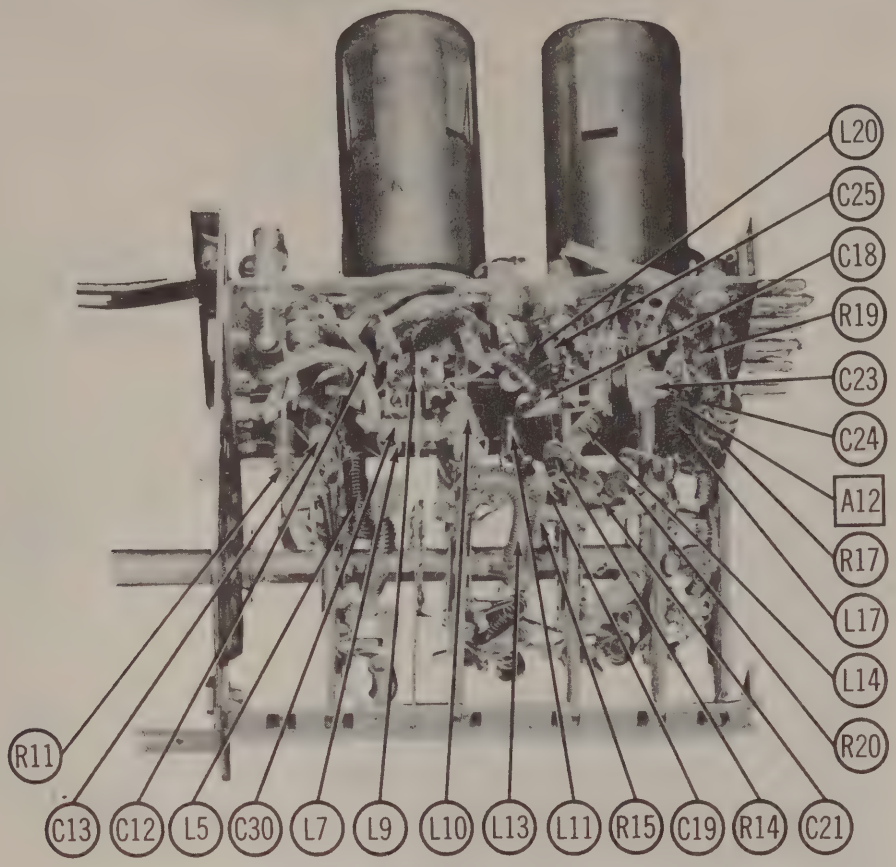
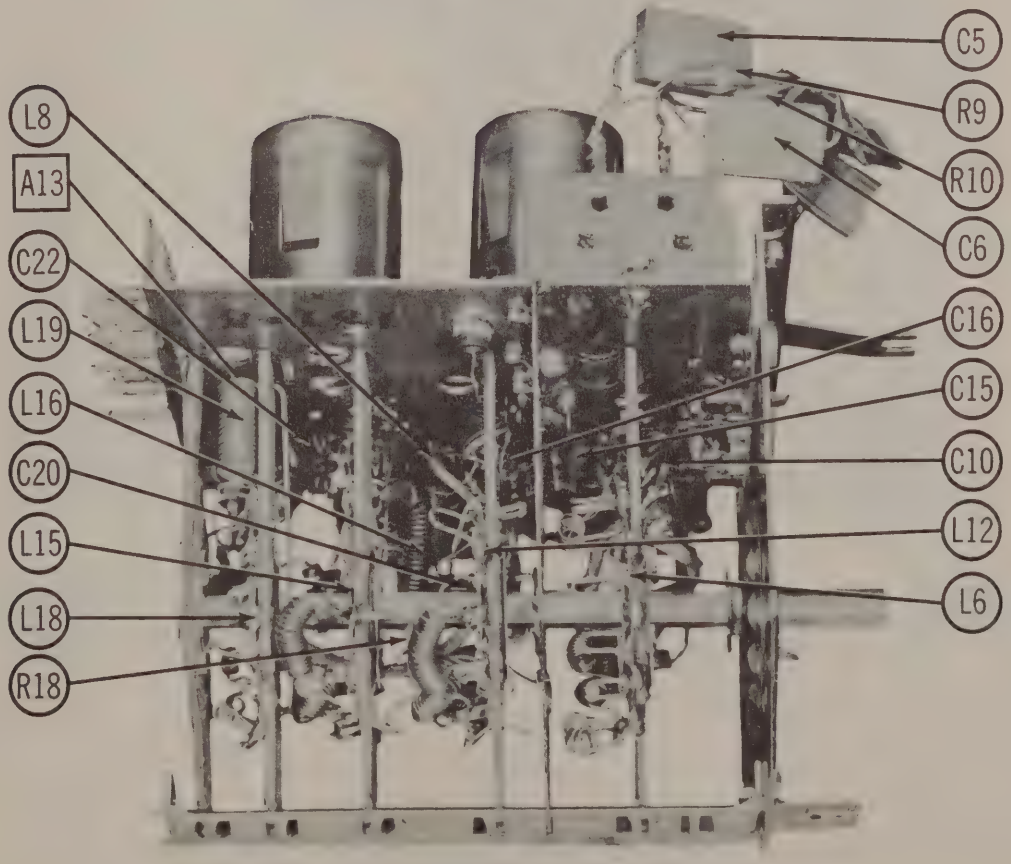


FIG. 3



RF TUNER-RIGHT SIDE

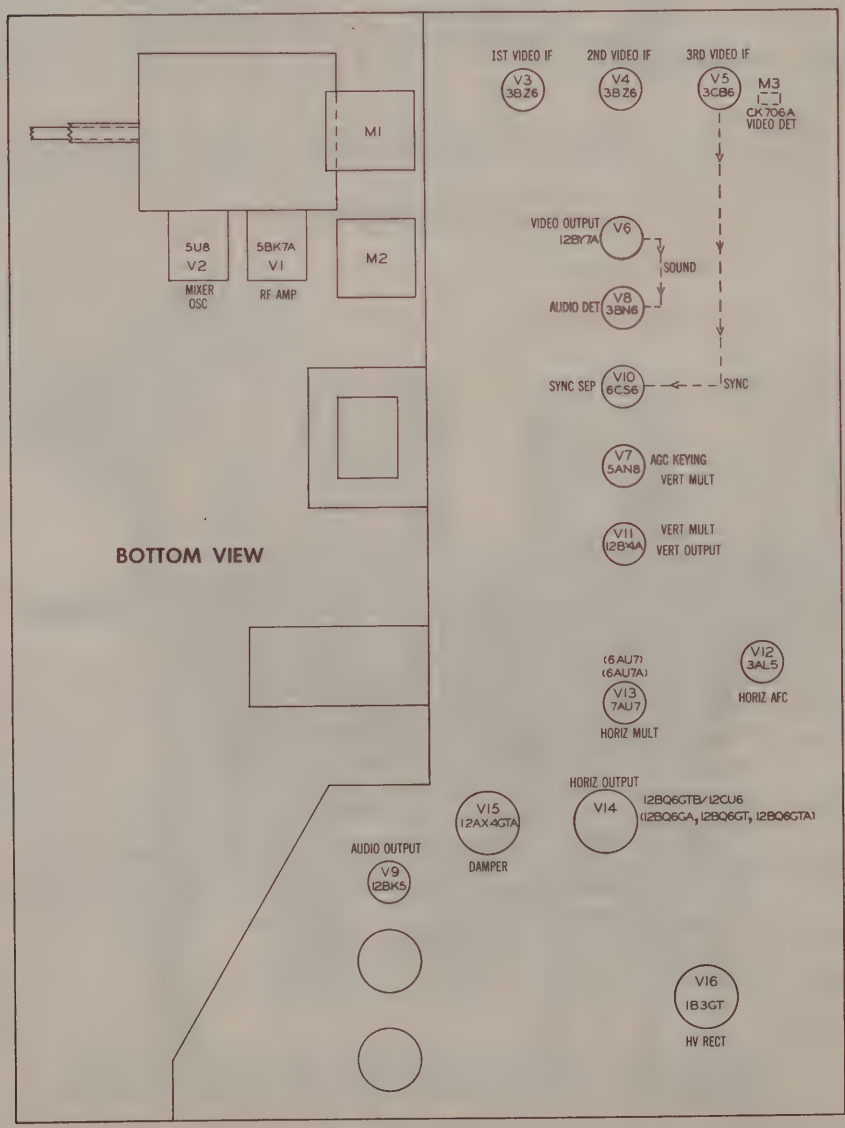


RF TUNER-LEFT SIDE

RESISTANCE MEASUREMENTS

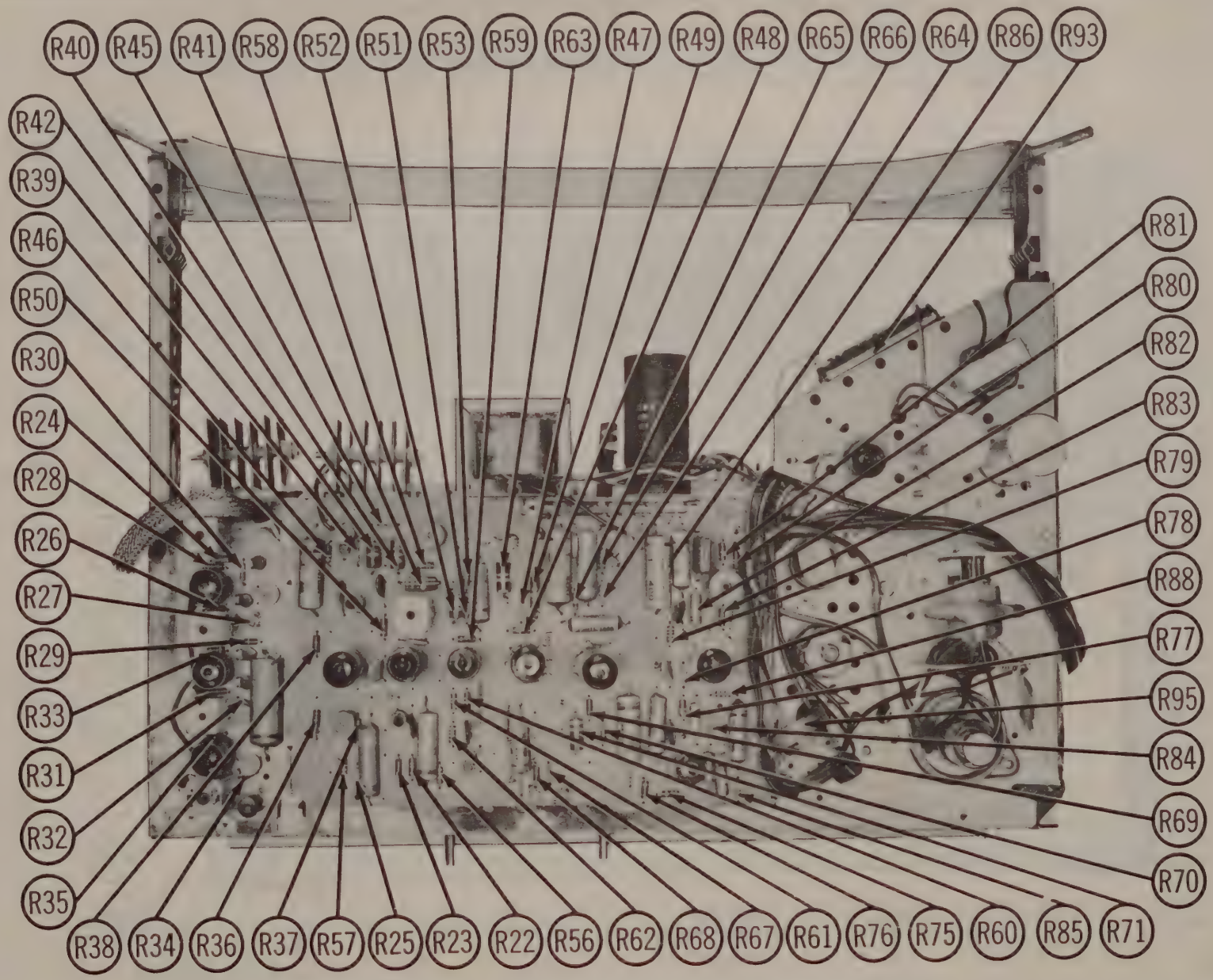
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	5BK7A	† 180Ω	500KΩ	INF	3Ω	2Ω	INF	2Meg	0Ω	0Ω
V 2	5U8	† 7KΩ	470KΩ	† 120KΩ	3Ω	4Ω	† 3KΩ	0Ω	0Ω	15KΩ
V 3	3BZ6	120KΩ	47Ω	5Ω	4Ω	† 2. 5KΩ	† 2. 5KΩ	0Ω		
V 4	3BZ6	120KΩ	47Ω	5Ω	6Ω	† 2. 5KΩ	† 2. 5KΩ	0Ω		
V 5	3CB6	. 1Ω	150Ω	6Ω	7Ω	† 2. 5KΩ	† 2. 5KΩ	0Ω		
V 6	12BY7A	15Ω	3. 3KΩ	0Ω	8Ω	8Ω	7Ω	† 4KΩ	† 2KΩ	0Ω
V 7	5AN8	▲ 4Meg	750KΩ	0Ω	10Ω	11Ω	500KΩ	† 180Ω	† 26KΩ	†15KΩ
V 8	3BN6	400Ω	. 6Ω	8Ω	9Ω	† 23KΩ	5. 8Ω	† 330KΩ		
V 9	12BK5	† 1. 2KΩ	NC	200KΩ	17Ω	15Ω	220Ω	200KΩ	† 820Ω	NC
V 10	3CS6	50KΩ	0Ω	9Ω	10Ω	† 35KΩ	† 12KΩ	1Meg		
V 11	12B4A	1KΩ	2. 2Meg	11Ω	13Ω	13Ω	NC	2. 2Meg	NC	† 1. 3KΩ
V 12	3AL5	1Meg	2Meg	14Ω	15Ω	1Meg	0Ω	0Ω		
V 13	7AU7	† 60KΩ	250KΩ	820Ω	13Ω	13Ω	† 60KΩ	3Meg	820Ω	14Ω
V 14	12BQ6GTB/ 12CU6	NC	20Ω	NC	† 8. 4KΩ	470KΩ	NC	17Ω	0Ω	TOP CAP ▲ 18Ω
V 15	12AX4GTA	NC	NC	5Meg	NC	180Ω	NC	22Ω	20Ω	
V 16	1B3GT	PINS 1-8 HAVE INF RESISTANCE								TOP CAP ▲ 658Ω
V 17	21ALP4A	0Ω	150KΩ	PIN 6 † 2KΩ	PIN 10 ▲ 1Meg	PIN 11 † 270KΩ	PIN 12 2Ω			

† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V15.
NC-NO CONNECTION.

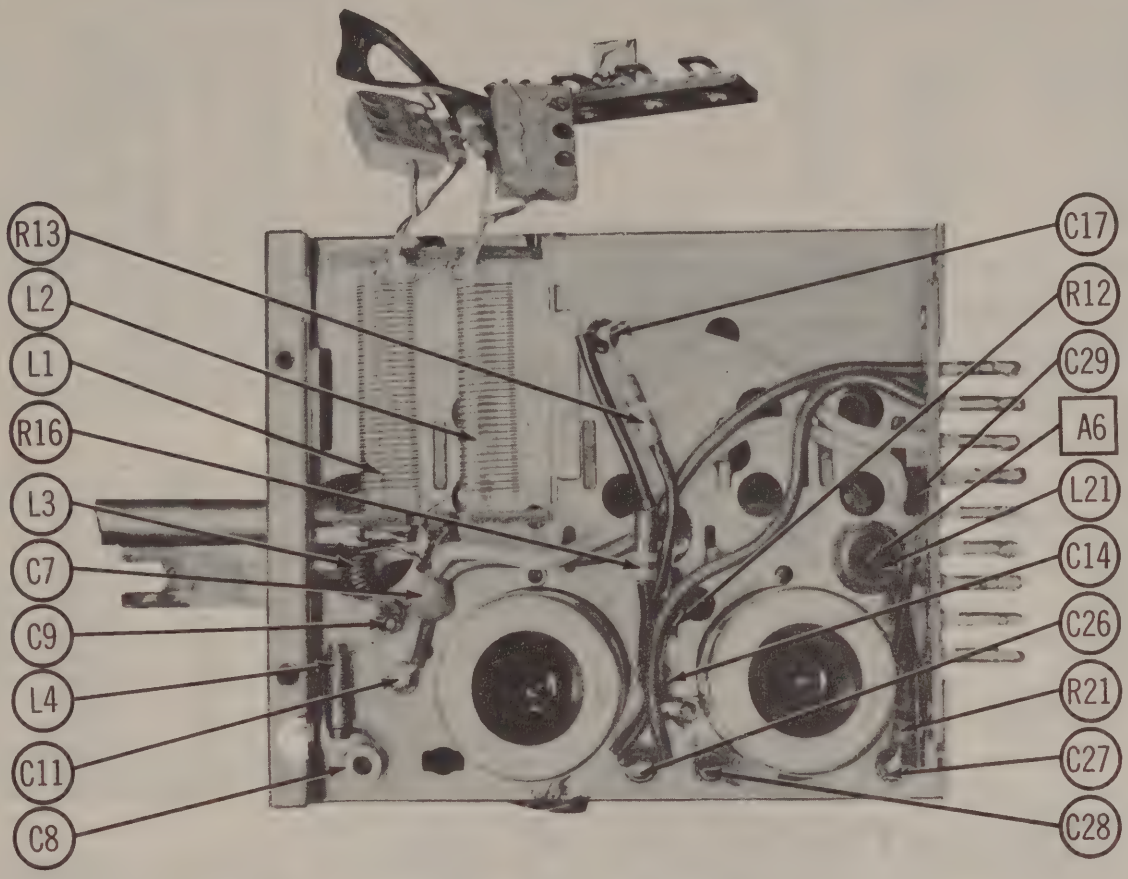


TUBE PLACEMENT CHART

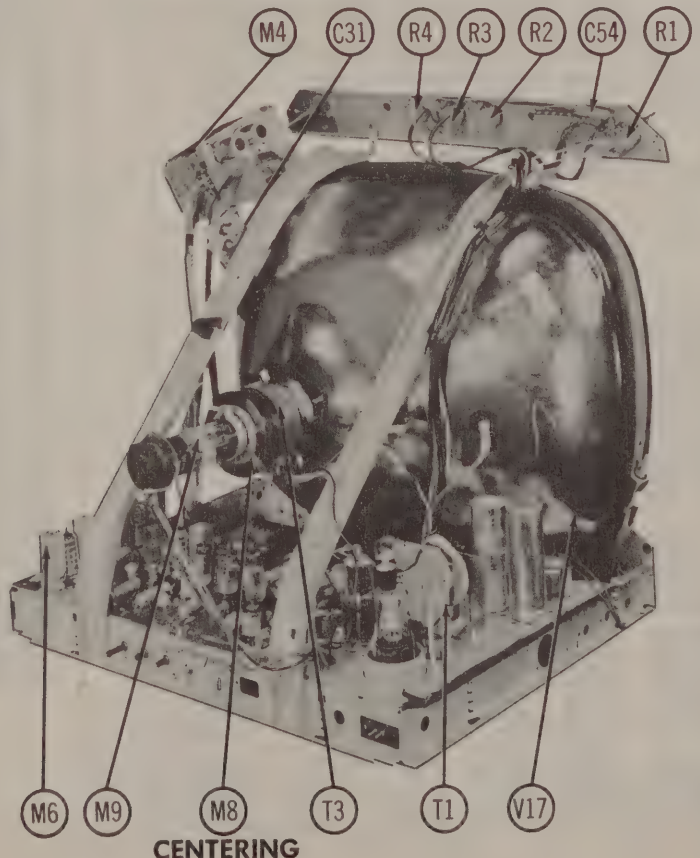
CHASSIS BOTTOM VIEW CAPACITOR & RESISTOR IDENTIFICATION



CHASSIS TOP VIEW RESISTOR IDENTIFICATION



RF TUNER-TOP VIEW



CHASSIS -REAR VIEW

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amp.	5BK7A	5BK7A	
V2	Mixer-Oscillator	5U8	5U8	
V3	1st Video IF Amp.	3BZ6	3BZ6	
V4	2nd Video IF Amp.	3BZ6	3BZ6	
V5	3rd Video IF Amp.	3CB6	3CB6	
V6	Video Output	12BY7A	12BY7A	
V7	AGC Keying - Vert. Mult.	5AN8	5AN8	
V8	Audio Det.	3BN6	3BN6	
V9	Audio Output	12BK5	12BK5	
V10	Sync Sep.	3CS6	3CS6	
V11	Vert. Mult. -Vert. Output	12B4A	12B4A	
V12	Horiz. AFC	3AL5	3AL5	
V13	Hortz. Mult.	7AU7	7AU7	6AU7 or 6AU7A may be used as an alternate.
V14	Horiz. Output	12BQ6GTB/ 12CU6	12BQ6GTB/ 12CU6	12BQ6GA, 12BQ6GT, or 12BQ6GTA may be used in this application.
V16	HV Rect.	1B3GT	1B3GT	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: Westinghouse PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V17	21ALP4A ①	21ALP4A ① 21ALP4B ①	21ALP4A ①	21ALP4A ② 21ALP4A/B ②	① Aluminized ② Silver Screen "85"
	21ALP4 24DP4	21ALP4		21ALP4 24DP4	
	24DP4A ①	24DP4A ①	24DP4A ①	24DP4A ②	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	160	200	V-15329-1	AFH81-37-25	XA004	FP227.6	TM-200-250	S-160	TVL-2684
C2A	▲160	350	V-15884-1			FP419.65	TM-4111	T-115	
B	4	300					TD-80-350	MTD-4510	
C	■60	300							
D	▲10	300							
C3A	▲150	300	V-15885-1			FP419.37		T-552	
B	▲30	300						MTD-3520	
C	■30	300							
D	150	50							
C4	4	450	(Note 1)	PRS450V4	BR445	TC70	TD-4-450	FM-4504	TVA-1702

Note 1. Not used in some versions.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	330	500	213V023A31	SI330	DD-331	5W5T33	811-331	UC-5333	1FM-333	
C6	330	500	213V023A31	SI330	DD-331	5W5T33	811-331	UC-5333	1FM-333	
C7	150			BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C8	5-10									
C9	18									
C10	15			SI15	DD-150	G021	831-150	UC-5415	5GA-Q15	
C11	1000									
C12	4									
C13	3.3			NP0-SI3.3	TCZ-3R3	TZ06	NP0A-3R3	ZT-5533	5TCCB-V33	
C14	1000									
C15	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C16	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C17	1000									
C18	.3									
C19	1.2									
C20	12			SI12	D6-120	G019	831-120	UC-5412	5GA-Q12	
C21	15			SI15	DD-150	G021	831-150	UC-5415	5GA-Q15	
C22	1.2									
C23	1.5									
C24	10									
C25	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C26	1000									
C27	1000									
C28	1000									
C29	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C30	1000			EF-001	MFT-1000				503C-D1	
C31	5000	1500	V-10710-18	HVD-15-4700		V2D5	1R5KV-472			
C32	4700		R2CC62Z5Z472M	BPD-0047	DD-472	K079	811-0047	DC-525	5HK-D47	
C33	.047	400	210V024A73	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C34	.022	600	210V062A23	BPD-02	DD-203	CUB6S22	817-02	PT6122	6TM-S22	
C35	680		R2CC61Z5Z681P	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C36	680		R2CC61Z5Z681P	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C37	680		R2CC61Z5Z681P	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C38	.22	400	210V012A24	P488N-22		CUB4P22		PT4022	4TM-P22	
C39	680		R2CC61Z5Z681P	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C40	1500		R2CC62Y5Y152M	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C41	1000		†V-15715-1	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C42	4700		R2CC62Z5Z472M	BPD-0047	DD-472	K079	811-0047	DC-525	5HK-D47	
C43	56		R1CC62R2G560K							
C44	.1	400	210V011A04	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C45	.22	400	210V012A24	P488N-22		CUB4P22		PT4022	4TM-P22	
C46	.01	600	210V061A03	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C47	.15	400	210V011A54	P488N-15		CUB4P15		PT4015	4TM-P15	
C48	.1	400	210V011A04	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C49	6.8		V-8963-6898	NP0-SI6.8	TCZ-6R8	TZ08	NP0A-6R8	ZT-5568	5TCCB-V68	
C50	56									
C51	4700		R2CC62Z5Z472M	BPD-0047	DD-472	K079	811-0047	DC-525	5HK-D47	
C52	4700		R2CC62Z5Z472M	BPD-0047	DD-472	K079	811-0047	DC-525	5HK-D47	
C53	2200		R2CC63Y5Y222M	BPD-0022	DD-222	K073	811-0022	UC-5222	5HK-D22	
C54	.022	600	210V062A23	BPD-02	DD-203	CUB6S22	817-02	PT6122	6TM-S22	
C55	.0047	600	210V064A72	SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C56	.01	600	210V061A03	BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C57	4700		R2CC62Z5Z472M	BPD-0047	DD-472	K079	811-0047	DC-525	5HK-D47	
C58	.02	600	V-15997-2							
C59	.1	400	210V011A04	P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C60	.022	600	210V062A23	BPD-02	DD-203	CUB6S22	817-02	PT6122	6TM-S22	
C61	1000		R2CC62Y5Z102M	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C62	.0015	1000	210V071A52	HVD-15-1500	DD-152	CUB16D15	1R5KV-152	DC30215	MB-D15	
C63	150		R1CC62T2H151K	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C64	82		R1CC62R2G820K							
C65	68		R1CC62R2G680K							

PARTS LIST AN

CAPA

ITEM No.	RATING: CAP.	RATING: VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRAL PART N
C66	390	500	213V013A91	1469-00039	D6-391
C67	680	500	213V016A81	SI680	D6-681
C68	.01	600	210V061A03	BPD-01	D6-103
C69	4700		R2CC62Z5Z472M	BPD-0047	DD-472
C70	.01	600	210V061A03	BPD-01	D6-103
C71	.1	400	210V011A04	P488N-1	DF-104
C72	3900	500	213V103A92	1464-0039	
C73	100		R1CC62R2G101K		
C74	390	500	213V013A91	1469-00039	D6-391
C75	.01	600	210V061A03	BPD-01	D6-103
C76	.1	600	210V011A04	P688N-1	DF-104
C77	.47	400	210V014A74	P488N-47	
C78	.05	600		BPD-05	DF-503
C79	.15	600	210V011A54	P688N-15	
C80	680		R2CC61Z5Z681P	BPD-00068	DD-681
C81	680		R2CC61Z5Z681P	BPD-00068	DD-681
C82	680		R2CC61Z5Z681P	BPD-00068	DD-681
C83	10000	1400	V-10710-13		
C84	1000	1400		HVD-15-1000	DD30-
C85	1000	1400		HVD-15-1000	DD30-

Note 2. Not used in some versions.
Note 3. Some versions use .1MFD in this application (part
Note 4. Some versions use 5000MMF in this application (pa
† Items C41 and R35 are combined in one unit.

CON

ITEM No.	RATING: RESIST-ANCE	RATING: WATTS	REPLACEME: Westinghouse PART No.	CENTRALAB PART No.	CLARO PART
R1A	100Ω	½	V16021-2		
B	500KΩ	½			
R2A	60KΩ	½	V15918-2	B-31	A47-75
B	Shaft		Not Req.	Not Req.	FS-3
R3A	1.5Meg	½	V15918-4	AB-742	A47-1.5
B	Shaft		Not Req.	AK-3	FS-3
R4A	100KΩ	½	V15918-3	B-40	A47-100
B	Shaft		Not Req.	Not Req.	FS-3
R5A	600Ω	½	V12709-14	AB-4	A47-75
B	Shaft		Not Req.	AK-4	RN-3
R6A	5Meg	½	V12709K-11	AB-87	A47-5M
B	Shaft		Not Req.	AK-19	RN-3
R7A	5Meg	½	V12709K-11	AB-87	A47-5M
B	Shaft		Not Req.	AK-19	RN-3
R8A	1200Ω	1	V14762-4	VK-130	A43-15
B	Shaft		Not Req.	Not Req.	FKS-½

Note 1. Part No. V12709-15 used as an alternate in some

RESI

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Westinghouse PART No.	IRC PART No.	NOTES
R9	220KΩ	½	250V232A24	BTS-220K	
R10	220KΩ	½	250V232A24	BTS-220K	
R11	47KΩ	½		BTS-47K	
R12	1Meg	½		BTS-1Meg	
R13	750KΩ 5%	½		BTS-750K 5%	
R14	470KΩ	½			
R15	6800Ω	½		BTS-6800	
R16	120KΩ	½			
R17	3900Ω	1			
R18	10KΩ	½		BTS-10K	
R19	15KΩ	½			
R20	150KΩ	½			
R21	1000Ω	½		BTS-1000	
R22	15Meg 5%	½	250V211A56	BTS-15Meg5%	
R23	1.5Meg 5%	½	250V211A55	BTS-1.5Meg5%	
R24	5600Ω	½	V-9927-22	BTS-5600	
R25	390KΩ	½	250V223A94	BTS-390K	
R26	10KΩ	½	V-9927-10		
R27	470Ω	½	250V234A71	BTS-470	
R28	47Ω	½	250V224A70	BTS-47	
R29	8200Ω	½	V-9927-21		
R30	120KΩ	½	250V221A24	BTS-120K	
R31	8200Ω	½	V-9927-21		
R32	470Ω	½	250V234A71	BTS-470	
R33	47Ω	½	250VAE470K	BTS-47	
R34	470Ω	½	250V234A71	BTS-470	
R35	150Ω		† V-15715-1	BTS-150	
R36	220Ω	½	250V222A21	BTS-220	
R37	3300Ω	½	250V223A32	BTS-3300	
R38	220Ω	½	250V232A21	BTS-220	
R39	22KΩ	½	250V222A23	BTS-22K	
R40	12KΩ	2	250V421A23	BTB-12K	
R41	2700Ω	2	250V422A72	BTB-2700	
R42	2700Ω	2	250V422A72	BTB-2700	
R43	150KΩ	½	250V221A54	BTS-150K	
R44	1Meg	½	250V221A05	BTS-1Meg	
R45	82KΩ	½	250V228A23	BTS-82K	
R46	220KΩ	½	250V222A74	BTS-220K	
R47	22KΩ	½	250V222A23	BTS-22K	
R48	15KΩ 5%	½	250V211A53	BTS-15K 5%	
R49	56KΩ 5%	1	250V315A63	BTA-56K 5%	
R50	470Ω	½	250V234A71	BTS-470	
R51	330KΩ	½	250V223A34	BTS-330K	
R52	22KΩ	2	250V422A23	BTB-22K	
R53	12KΩ	½	250V221A23	BTS-12K	

Note 1. Some versions use a 91Ω ½W 5% resto
Note 2. Some versions use a 220KΩ ½W re
† Items R35, C41 are combined in one uni

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	REPLACEMENT DATA: Westinghouse PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amp.	5BK7A	5BK7A	
V2	Mixer-Oscillator	6U8	6U8	
V3	1st Video IF Amp.	3BZ6	3BZ6	
V4	2nd Video IF Amp.	3BZ6	3BZ6	
V5	3rd Video IF Amp.	3CB6	3CB6	
V6	Video Output	1BH7A	1BH7A	
V7	AGC Keying - Vert. Mult.	5AN8	5AN8	
V8	Audio Det.	3BN6	3BN6	
V9	Audio Output	1BX5	1BX5	
V10	Sync Sep.	3C66	3C66	
V11	Vert. Mult.-Vert. Output	1BH4A	1BH4A	
V12	Horiz. APC	7AL5	7AL5	
V13	Horiz. Mult.	7AU7	7AU7	
V14	Horiz. Output	1B3GC8/GTB/ 12CU6	1B3GC8/GTB/ 12CU6	
V16	HV Rect.	1B3GT	1B3GT	

6AU7 or 6AU7A may be used as an alternate.
1B3GC8A, 1B3GC8T, or 1B3GC8TA may be used in this application.

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: Westinghouse PART No	CBS PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No	NOTES
V17	21ALP4A ③	21ALP4A ③ 21ALP4A ④	21ALP4A ①	21ALP4A ② 21ALP4A/B ③	Aluminized Silver Screen "85"
	21ALP4	21ALP4		21ALP4	
	24DP4			24DP4	
	24DP4A ①	24DP4A ①	24DP4A ①	24DP4A ②	

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	RATING: VOLT	REPLACEMENT DATA: Westinghouse PART No	AEROVOX PART No	CORNELL-DUBILIER PART No.	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No
C1	180	300	V-15329-1	AFBSI-37-25	XA004	FP227.5	TM-200-350	S-180	TVL-2584
C3A	±180	350	V-15884-1			FP419.65	TM-411 TD-80-350	TM-411 MTD-4510	
B	4	300							
C	±80	300							
D	±10	300							
C3A	±150	300	V-15885-1			FP419.87		T-553	
B	±30	300						MTD-3530	
C	±30	300							
D	150	50							
C4	4	450	(Note 1)	PR8450V4	BR445	TC70	TD-4-450	FM-4504	TVA-1702

Note 1. Not used in some versions.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Westinghouse Part No.	AEROVOX PART NO.	CENTRALAB PART NO.	CORNELL-DUBILIER PART No.	ERIE PART NO.	MALLORY PART NO.	SPRAGUE PART NO.	NOTES
C2	330	500	213V023A31	SI330	DD-331	5WS733	811-331	UC-5333	1FM-333	
C5	330	500	213V023A31	SI330	DD-331	5WS733	811-331	UC-5333	1FM-333	
C7	150			BPD-00015	DD-151	G046	811-151	UC-5315	5GA-Y15	
C8	5-10									
C9	18									
C10	15			SI15	DD-150	G021	831-150	UC-5415	5GA-Q15	
C11	1000									
C12	4									
C13	9.3			NP6-SI3.3	TCZ-3R3	TZ06	MPDA-3R3	ZT-5533	5TCCB-V33	
C14	1000									
C15	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-DI	
C16	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-DI	
C17	1000									
C18	.3									
C19	1.3									
C20	12			SI13	D6-120	G019	831-120	UC-5413	5GA-Q12	
C21	15			SI15	DD-150	G021	831-150	UC-5415	5GA-Q15	
C22	1.3									
C23	1.5									
C24	10									
C25	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-DI	
C26	1000									
C27	1000									
C28	1000									
C29	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-DI	
C30	1000			EF-001	MPT-1000				503C-DI	
C31	5000	1500	V-15710-18	HVD-15-4700		VZD6	1R5KV-472			
C33	4700		RCC8C2252472M	BPD-0047	DD-472	K079	811-0047	DC-535	5HK-D47	
C34	.047	400	210V024A73	BPD-05	DP-503	CUBB47		PT4147	4TM-S47	
C35	.022	600	210V024A33	BPD-03	DP-303	CUBB22	817-02	PT3122	4TM-S22	
C36	680		RCC8C2252681P	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C37	680		RCC8C2252681P	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C38	680		RCC8C2252681P	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C39	.22	400	210V012A34	P468N-22		CUBP422		PT4022	4TM-P22	
C40	680		RCC8C2252681P	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C42	1500		RCC8C2Y5Y152M	BPD-0015	DD-152	K071	801-0015	DC-5315	5HK-D15	
C41	1000		1V-15715-1	BPD-001	DD-102	K069	801-001	DC-521	5HK-DI	
C43	4700		RCC8C2252473M	BPD-0047	DD-472	K079	811-0047	DC-535	5HK-D47	
C43	56		RCC82R3G560K							
C44	.1	400	210V011A04	P468N-1	DP-104	CUB4P1		PT401	4TM-P1	
C45	.22	400	210V012A34	P468N-22		CUBP422		PT4022	4TM-P22	
C46	.01	600	210V016A03	D6-103	DD-681	CUB681	GP3-333-103	PT601	6TM-S1	
C47	.15	400	210V014A54	P468P-15		CUBP415		PT4015	4TM-P15	
C48	.1	400	210V011A04	P468N-1	DP-104	CUB4P1		PT401	4TM-P1	
C49	6.8		V-8963-6886	NP6-SI6.8	TCZ-6R8	TZ06	MPDA-6R8	ZT-5568	5TCCB-V68	
C50	56									
C51	4700		RCC8C2252472M	BPD-0047	DD-472	K079	811-0047	DC-535	5HK-D47	
C52	4700		RCC8C2252472M	BPD-0047	DD-472	K079	811-0047	DC-535	5HK-D47	
C53	2200		RCC8C3Y3Y222M	BPD-0022	DD-223	K073	811-0022	UC-5322	5HK-D22	
C54	.022	600	210V063A33	BPD-03	DP-303	CUBM33	817-03	PT3122	6TM-S22	
C55	.0047	600	210V064A73	SI4700	DP-473	CUBD47	GP3-333-472	PT2147	6TM-D47	
C56	.01	600	210V061A03	BPD-01	D6-103	CUB681	GP3-333-103	PT601	6TM-S1	
C57	4700		RCC8C2252472M	BPD-0047	DD-473	K079	811-0047	DC-535	5HK-D47	
C58	.02	600	V-15997-2							
C59	.1	400	210V011A04	P468N-1	DP-104	CUB4P1		PT401	4TM-P1	
C60	.022	600	210V063A33	BPD-03	DP-303	CUBM33	817-03	PT3122	6TM-S22	
C61	1000		RCC8C3Y3Z102M	BPD-001	DD-102	K069	801-001	DC-521	5HK-DI	
C62	.0018	1000	210V071A32	HVD-15-1500	DD-182	CUB182S	1R5KV-183	DC3018	MD-3D5	
C63	150		RCC8C2Y2R151K	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-Y15	
C64	82		RCC8C2R3G820K							
C65	68		RCC8C2R3G680K							

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Westinghouse PART No.	AEROVOX PART NO.	CENTRALAB PART NO.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART NO.	SPRAGUE PART NO.	NOTES
C66	390	500	213V018A51	1469-00039	DS-391	5RS729	811-391	MC3E43	1HS-339	
C67	390	500	213V018A51	SI390	DS-391	5WS729	811-391	UC-5329	1FM-339	
C68	.01	600	210V061A03	BPD-01	DP-103	CUB681	GP3-333-103	PT601	6TM-S1	
C69	4700		RCC8C2252472M	BPD-0047	DD-472	K079	811-0047	DC-535	5HK-D47	
C70	.01	600	210V061A03	BPD-01	DP-103	CUB681	GP3-333-103	PT601	6TM-S1	
C71	.1	400	210V011A04	P468N-1	DP-104	CUB4P1		PT401	4TM-P1	
C72	3900	600	210V039A93	1466-00039		1R6D39		MC3E48	6HS-339	
C73	100		RCC82R3G100K							
C74	390	500	213V018A51	1469-00039	DS-391	5RS729	811-391	MC3E43	1HS-339	
C75	.01	600	210V061A03	BPD-01	DP-103	CUB681	GP3-333-103	PT601	6TM-S1	
C76	.1	600	210V011A04	P468N-1	DP-104	CUB4P1		PT401	6TM-P1	
C77	.47	400	210V014A74	P468N-47		CUBP447		PT4147	4TM-P47	
C78	.05	600		BPD-05	DP-503	CUBD05		PT505	6TM-S5	Note 3
C79	.18	600	210V018A54	P688N-18		CUBD418		PT6018	6TM-P18	Note 3
C80	680		RCC81252681P	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C81	680		RCC81252681P	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	
C82	680		RCC81252681P	BPD-00068	DD-681	K065	811-681	UC-5368	5GA-T68	Note 2
C83	10000	1400	V-10710-13						301KBD-S1	
C84	1000	1400		HVD-15-1000	DD30-102	MCD1	1R5KV-102	DC3031	30GA-D1	Note 4
C85	1000	1400		HVD-15-1000	DD30-103	MCD1	1R5KV-103	DC3031	30GA-D1	Note 4

Note 2. Not used in some versions.
Note 3. Some versions use .1MFD in this application (part #210V061A04).
Note 4. Some versions use 5000MMF in this application (part #V-10710-18).
† Items C41 and R39 are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Westinghouse PART No	CENTRALAB PART NO	CLAROSTAT PART No.	IRC PART No	MALLORY PART NO	INSTALLATION NOTES
R1A	100Ω	½	V16021-2				UE438	Picture (Panel)
B	500KΩ	½						Volume & Switch (Rear)
R2A	60KΩ	½	V15918-2	B-31	A47-75K-S	Q11-125	U-41	Horizontal Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A.
R3A	1.5Meg	½	V15816-4	AB-742	A47-1.5Meg-S	Q11-138	U-155	Vertical Hold
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R3A.
R4A	100KΩ	½	V15816-3	B-40	A47-100K-S	Q11-137	U-41	Brightness
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A.
R5A	500Ω	½	V12709-14	AB-4	A47-750-S	Q11-105	TA2T5L	Quieting
B	Shaft		Not Req.	AK-4	RN-3	SQ	Not Req.	Attach to R5A
R6A	5Meg	½	V12709K-11	AB-87	A47-5Meg-S	Q11-141	TA5EL	Sync - Note 1
B	Shaft		Not Req.	AK-19	RN-3	SQ	Not Req.	Attach to R6A.
R7A	5Meg	½	V12709K-11	AB-87	A47-5Meg-S	Q11-141	TA5EL	Height - Note 1
B	Shaft		Not Req.	AK-19	RN-3	SQ	Not Req.	Attach to R7A.
R8A	1200Ω	1	V14756-1	VK-120	A43-1200		BU50L	Vertical Linearity
B	Shaft		Not Req.	Not Req.	FS2-3		Not Req.	Attach to R8A.

Note 1. Part No. V13709-15 used as an alternate in some versions.

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATTS	REPLACEMENT DATA: Westinghouse PART No.	IRC PART No.	NOTES
R9	220KΩ	½	250V225A34	BTS-220K	Note 1
R10	220KΩ	½	250V225A24	BTS-220K	
R11	1KΩ	½		BTS-47K	
R13	1Meg	½		BTS-1Meg	
R13	750KΩ 5%	½		BTS-750K 5%	
R14	470KΩ	½			
R15	680Ω	½		BTS-680Ω	
R16	120KΩ	½			
R17	3300Ω	½			
R18	10KΩ	½		BTS-10K	
R19	15KΩ	½			
R20	150KΩ	½			
R21	1000Ω	½		BTS-1000	
R22	15Meg 5%	½	250V215A56	BTS-15Meg5%	
R23	1.5Meg 5%	½	250V215A55	BTS-1.5Meg5%	
R24	5600Ω	2	V-9927-21	BTS-5600	
R25	390KΩ	½	250V223A94	BTS-390K	
R26	10KΩ	½	V-9927-10		
R27	470Ω	2	250V223A47	BTS-470	
R28	47Ω	2	250V224A70	BTS-47	
R29	5600Ω	2	V-9927-31		
R30	120KΩ	½	250V221A24	BTS-120K	
R31	8200Ω	½	V-9927-21		
R32	470Ω	½	250V234A71	BTS-470	
R33	47Ω	½	250VAX470K	BTS-47	
R34	470Ω	½	250V234A71	BTS-470	
R35	150Ω	½	† V-15715-1	BTS-150	
R36	220Ω	½	250V222A21	BTS-220	
R37	3300Ω	½	250V223A32	BTS-3300	
R38	220Ω	½	250V233A21	BTS-220	
R39	220Ω	½	250V222A23	BTS-22K	
R40	12KΩ	2	250V421A23	BTS-12K	
R41	2700Ω	2	250V422A72	BTS-2700	
R42	2700Ω	2	250V423A72	BTS-2700	
R43	150KΩ	½	250V221A54	BTS-150K	
R44	1Meg	½	250V221A25	BTS-1Meg	
R45	82KΩ	½	250V228A23	BTS-82K	
R46	220KΩ	½	250V222A74	BTS-220K	
R47	22KΩ	½	250V223A23	BTS-22K	
R48	15KΩ 5%	½	250V215A53	BTS-15K 5%	
R49	56KΩ 5%	½	250V215A63	BTS-56K 5%	
R50	470Ω	2	250V234A71	BTS-470	
R51	330KΩ	½	250V223A34	BTS-330K	
R53	22KΩ	2	250V422A23	BTS-22K	
R53	12KΩ	½	250V221A23	BTS-12K	

ITEM No.	RATING: OHMS	RATING: WATTS	REPLACEMENT DATA: Westinghouse PART No.	IRC PART No.	NOTES
R54	220Ω	½		BTS-220	
R55	820Ω	½	V-12171-10		
R56	270KΩ	½	250V222A74	BTS-270K	
R57	47KΩ	½	250V224A73	BTS-47K	
R58	8200Ω	½	250V226A82	BTS-8200	
R59	1Meg	½	250V221A05	BTS-1Meg	
R60	68KΩ	½	250V226A63	BTS-68K	
R61	12KΩ	½	250V221A23	BTS-12K	
R62	47KΩ	2	250V424A73	BTS-47K	
R63	10KΩ	2	250V421A03	BTS-10K	
R64	470KΩ	½	250V224A74	BTS-470K	
R65	100KΩ	½	250V221A04	BTS-100K	
R66	33KΩ	½	250V223A33	BTS-33K	
R67	24K 5%	½	250V212A43	BTS-24K 5%	
R68	2.2Meg	½	250V222A25	BTS-2.2Meg	
R69	150Ω	½	250V221A81	BTS-150	
R70	2.2Meg	½	250V222A25	BTS-2.2Meg	
R71	470Ω	2	250V424A71	BTS-470	
R72	1000Ω	½	250V221A03	BTS-1000	
R73	560Ω	½	250V225A61		
R74	220Ω	½	250V222A21		
R75	1Meg	½	250V231A05		
R76	1Meg	½	250V221A05		
R77	220KΩ	½	250V221A24		
R78	470KΩ	½	250V224A74	BTS-470K	
R79	47KΩ	½	250V224A73		
R80	56KΩ	½	250V225A63		
R81	1000Ω	½	250V221A02		
R82	56KΩ	½	250V225A63	BTA-56K	
R83	220KΩ 5%	½	250V212A24		
R84	22KΩ	½	250V223A23	BTS-22K	
R85	3900Ω	½	250V232A92	BTS-3900	
R86	820Ω	½	250V226A21	BTS-820	
R87	150Ω	½	250V221A51		
R88	470KΩ	½	250V224A74		
R89	820Ω	½	V-12171-1	PW4-8200	
R90	680KΩ	½	250V226A84		
R91	4.7Ω	½	RRU344MTK	BW½-4.7	
R92	100KΩ	1	V-9927-18	BTA-100K	
R93	2000Ω	15	V-11328-24	2D-2000	
R94	10Ω	10			
R95	7.5Ω	10	V-18023-1		
R96	4Ω	20	V-15508-1		
R97	330KΩ	½	250V223A34	BTS-330K	Note 2

Note 1. Some versions use a 91Ω 1W 5% resistor in this application (Mfgr. Part No. 250V291A10).
Note 2. Some versions use a 220KΩ 1W resistor in this application (Mfgr. Part No. 250V222A24).
† Items R35, C41 are combined in one unit.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: Westinghouse PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No.	Triad PART No
T1	Horiz. Output Trans.	V-15650-3	FB420 & RF800 *‡	K187 *	A-255 *	PLY-76	D-49 *		
T2	Vert. Output Trans.	V-15325-4	Z1900 ②	A-2823	A-8142 ‡	26072	A-108X		
T3A	Horiz.(90°) Horiz. (120MHz) Vert. (58MHz)	V-15995-1 ③ V-16036-1 ③ V-15996-1 ⑤ V-16034-1 ⑤	DP807 ②	MDP-22 ②	23SD1 ②	T90F1643 ②	DY-16A ②	V-16 ②	V-41-1 ②

① Drill new mounting hole(s).
② Use 9 to 1 turns ratio.
③ Includes resistors R73 and R74.
④ Alternate deflection yoke.
⑤ Rear cover and centering device. Not supplied with yoke.
⑥ Yoke mounting clamp. Not supplied with yoke.
⑦ Use original rear cover and centering device.
⑧ Connect yoke terminal #3 to horizontal output transformer terminal #10; yoke terminal #1 to horizontal output terminal #7.
⑨ Connect horizontal damping network across terminals #3 and #7.
* Horizontal windings parallel connected.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
				2	5	5	5
1	8	5		5	4	4	6
11	4	4		1	4	4	6
10	2	4		8	4	4	6
7	1	2		7	2	2	1
4	Term #1 of RF800	7		3	7	7	3
3	Term #3 of RF800	8		6	8	8	4
Connect Width Coil Across	Terms #3 & #4 of RF800 across 4 & 3						
Special Notes	⑦ ⑧ ⑨	⑦ ⑧ ⑨		⑦ ⑧ ⑨	⑦ ⑧ ⑨	⑦ ⑧ ⑨	⑦ ⑧ ⑨

① Two turns required for filament winding.
② If unsolicited width, add capacity (approximately 56-100MMF ② 5KV) across horizontal yoke.
③ If AGC does not function properly, reverse width coil primary or secondary.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: Westinghouse PART No	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T4	7.5KΩ	3.5Ω	V-9258E-1	Z1013	A-3931	A-3878	26848	S-7X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA: Westinghouse PART No.	QUAM PART No.	RCA TYPE No	NOTES
	SIZE	FIELD	V. C. IMP				
SP1	5"	PM	3.5Ω	V-15597-1①	5A07	205S2	① Used in Models H-938K21, H-958K U21, H-939K21, H-959K21, H-941K21, H-961K21
	6"	PM	3.5Ω	V-16435-2②	6A2I	205S2	② Used in Models H-938K21, H-958K U21, H-939K21, H-959K21, H-941K21, H-961K21
	10"	PM	3.5Ω	V-9770-1③	10A2I	236S1	③ Used in Models H-954K24, H-954K U24, H-955K24, H-955K U24, H-941K21, H-961K U21
							④ Used in Models H-954K24, H-955K24, H-956K24, H-956K U24, H-942K21, H-962K U21

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI	DC RES.: SEC	REPLACEMENT DATA: Westinghouse PART No.	MEISSNER PART No.	MERIT PART No	MILLER PART No.	NOTES
L1	VHF Ant. Matching Trans.	.8Ω	.6Ω	V-8831-3				
L3	VHF Ant. Matching Trans.	.8Ω	.6Ω	V-8831-3				
L4	IF Trap	.1Ω						
L5	UHF IF Coil	0Ω						
L6	VHF Ant. Coils	0Ω						
L7	VHF Ant. Coil	0Ω						Channel 13
L8	VHF Ant. Choke	0Ω						
L9	Neut. Coil	0Ω						
L10	VHF RF Coil	0Ω						Channel 13
L11	VHF RF Coil	0Ω						
L12	VHF RF Coil	0Ω						
L13	UHF IF Coil	0Ω						
L14	VHF Mixer Grid Coil	0Ω						Channel 13
L15	VHF Mixer Grid Coils	0Ω						
L16	UHF RF Coil	0Ω						
L17	VHF Osc. Coil	0Ω						High Channels
L18	VHF Osc. Coils	0Ω						
L19	VHF Osc. Coil	0Ω						Low Channels
L20	RF Coil	0Ω						
L21	Conv. Plate	.8Ω	.1Ω	V-8805-2				
L22	1st Video IF	.1Ω	.1Ω	V-15683-1				Includes capa. and 41.25MC Trap
L23	2nd Video IF	.1Ω	.1Ω	V-15684-1				Includes capa. and 47.25MC Trap
L24	3rd Video IF	.1Ω	.1Ω	V-15685-1				
L25	Series Peaking Coil	7.3Ω		V-15796-1	19-3100	TV-181	6112	100 Microhenries
L26	Shunt Peaking Coil	9.5Ω		V-15796-5	19-1823		6122	220 Microhenries
L27	4.5MC Trap	1.2Ω		V-15795-1				
L28	Series Peaking Coil	5.8Ω		V-15796-4	19-3180	TV-184	6180	170 Microhenries
L29	Shunt Peaking Coil	1Ω		V-15796-7	19-3350	TV-186	6181	330 Microhenries
L30	Sound IF	.8Ω		V-15795-2				

WESTINGHOUSE MODELS H-934T21, H-934TU21, H-935T21, H-935TU21, H-938K21, H-938KU21, H-939K21, H-939KU21, H-941K21, H-941KU21, H-942K21, H-942KU21, H-950T24, H-950TU24, H-951T24, H-951TU24, H-954K24, H-954KU24, H-955K24, H-955KU24, H-956K24, H-956KU24 (Ch. V-2342-14, -24, -34, -44, V-2343-14, -24, -34, -44, V-2352-104, -204, -304, -404, V-2353-104, -204, -304, -404)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Westinghouse PART No.	REPLACEMENT DATA MEISSNER PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA MILLER PART No.	NOTES
L31	Quadrature Coil	5.8Ω		V-15790-1	19-1003		4608	3.3 Microhenries, IRC Part No. CLA
L32	RF Choke	3Ω		V-9099-2				

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Westinghouse PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L33	108Ω		V-15791-1							

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA Westinghouse PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.280ADC	V-15920-1	1238A	MR300	6S350	6Q4	350A	
M2	.280ADC	V-15920-1	1238A	MR300	6S350	6Q4	350A	

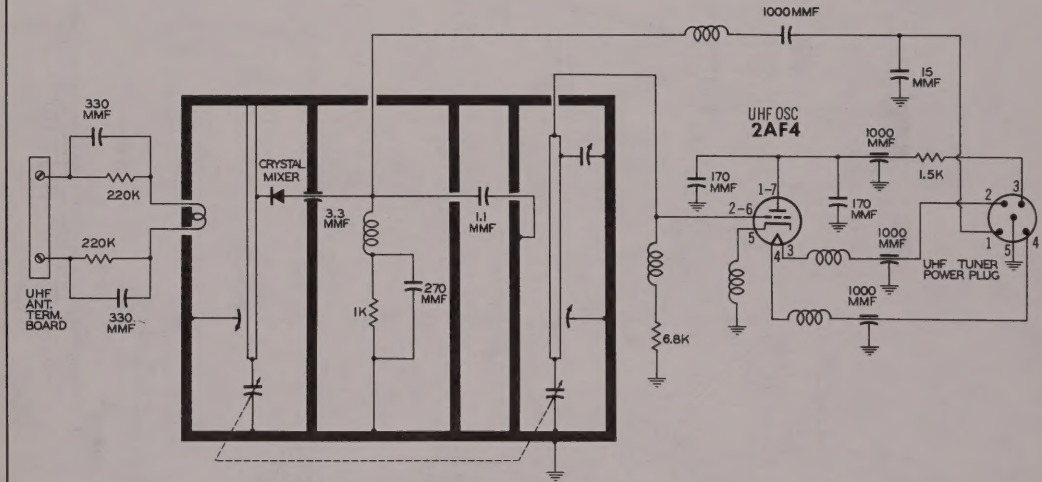
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA Westinghouse PART No.	REPLACEMENT DATA SYLVANIA PART No.	NOTES
M3	CK706A *		1N60	Video Det.

* Some versions may use crystal diode type 1N64 in this application.

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M4	Tuner	V-15880-1	VHF - All Chassis
M5	Tuner	V-15890-1	UHF, Combination VHF-UHF Tuner, Part No. V-15950-1. Used in Chassis V-2352-104, -204, -304, -404; V-2353-104, -204, -304, -404
M6	Video Det. Assy.	V-15686-1	Includes M3, Coils, & Capacitors
M7	Integrator	V-15666-1	Vertical-Centralab Part No. PC-104, Sprague Part No. 103C12
M8	Centering Device	V-15996-1	Includes Deflection Yoke T3, Rear Cover
M9	Ion Trap	V-9784-4	
B1	Trimmer Cap.	V-11228-2	Horiz. Multivibrator Trimmer (5-80MMF)
	Cabinet	V 1431-10	Models H-954K24, H-954KU24
	Cabinet	V-1431-11	Models H-955K24, H-955KU24
	Cabinet	V-1432-10	Models H-956K24, H-956KU24
	Cabinet	V-1444-1	Models H-938K21, H-938KU21
	Cabinet	V-1444-2	Models H-939K21, H-939KU21
	Cabinet	V-1427-11	Models H-941K21, H-941KU21
	Cabinet	V-1428-10	Models H-942K21, H-942KU21
	Cabinet	V-1422-1	Models H-950T24, H-950TU24
	Cabinet	V-1422-2	Models H-951T24, H-951TU24
	Knob	V-15813-7	VHF Channel Selector (13 Position)-Models H-954KU24, H-955KU24, H-956KU24, H-938KU21, H-929KU21, H-941KU21, H-942KU21, H-950TU24, H-951TU24
	Knob	V-15813-8	VHF Channel Selector (12 Position)-Models H-954K24, H-955K24, H-956K24, H-938K21, H-939K21, H-941K21, H-942K21, H-950T24, H-951T24
	Knob	V-15670-3	Horizontal, Vertical, Brightness-All Models
	Knob	V-15668-1	UHF Dial-Models H-954KU24, H-955KU24, H-956KU24, H-938KU21, H-939KU21, H-941KU21, H-942KU21, H-950TU24, H-951TU24
	Knob	V-15667-1	UHF Coarse & Fine Tuning-Models H-954KU24, H-955KU24, H-956KU24, H-941KU21, H-942KU21, H-950TU24, H-951TU24, H-938KU21, H-939KU21
	Knob	V-15671-3	VHF Fine Tuning-All Models
	Knob	V-15812-4	Picture-All Models
	Knob	V-15810-3	On-Off-Volume-All Models
	Safety Glass	V-15446-4	Models H-954K24, H-954KU24, H-955K24, H-955KU24, H-956K24, H-956KU24, H-950T24, H-950TU24, H-951T24, H-951TU24
	Safety Glass	V-16030-1	Models H-941K21, H-941KU21, H-942K21, H-942KU21, H-938K21, H-938KU21, H-939K21, H-939KU21
	Mask	V-15805-1	Models H-954K24, H-954KU24, H-955K24, H-955KU24, H-956K24, H-956KU24, H-950T24, H-950TU24, H-951T24, H-951TU24
	Mask	V-15804-1	Models H-941K21, H-941KU21, H-942K21, H-942KU21, H-938K21, H-938KU21, H-939K21, H-939KU21



UHF TUNER PART NO. V-15890-1 USED WITH CHASSIS V-2352-104, -204, -304, -404, AND V-2353-104, -204, -304, -404

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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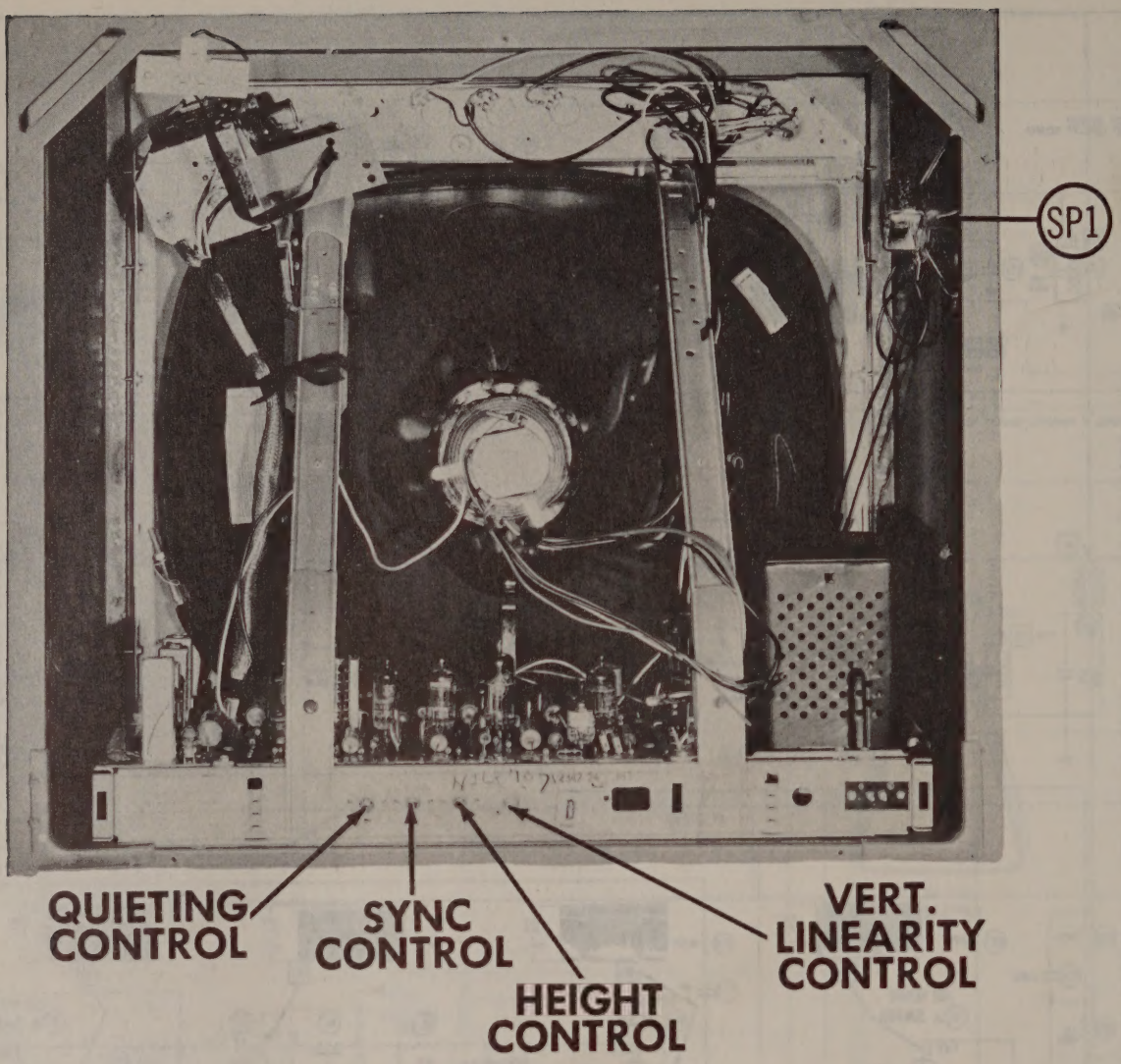
UHF TUNER SCHEMATIC



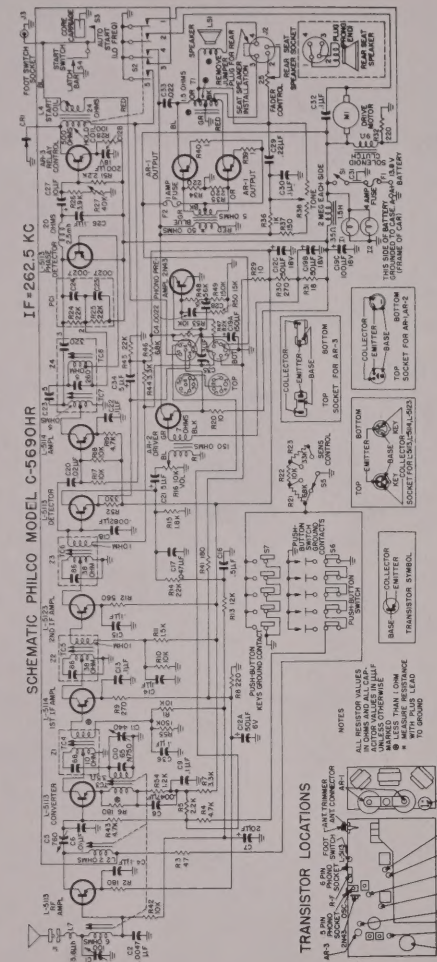
CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern. Set the horizontal hold control (R2) to its mid-range position.

Connect a short clip lead across the horizontal oscillator coil (L32). Connect the DC probe of a VTVM to pin 7 (grid) of the horizontal multivibrator tube (V13). Common to chassis.

Adjust the horizontal multivibrator trimmer (B1) for zero volts on VTVM. If necessary, turn the horizontal hold control slightly to obtain zero reading. Remove clip lead from L32 and adjust the horizontal oscillator slug (B2) for zero reading on VTVM. Switch off channel and back again. Picture should immediately pull into sync.



EMERSON MODELS

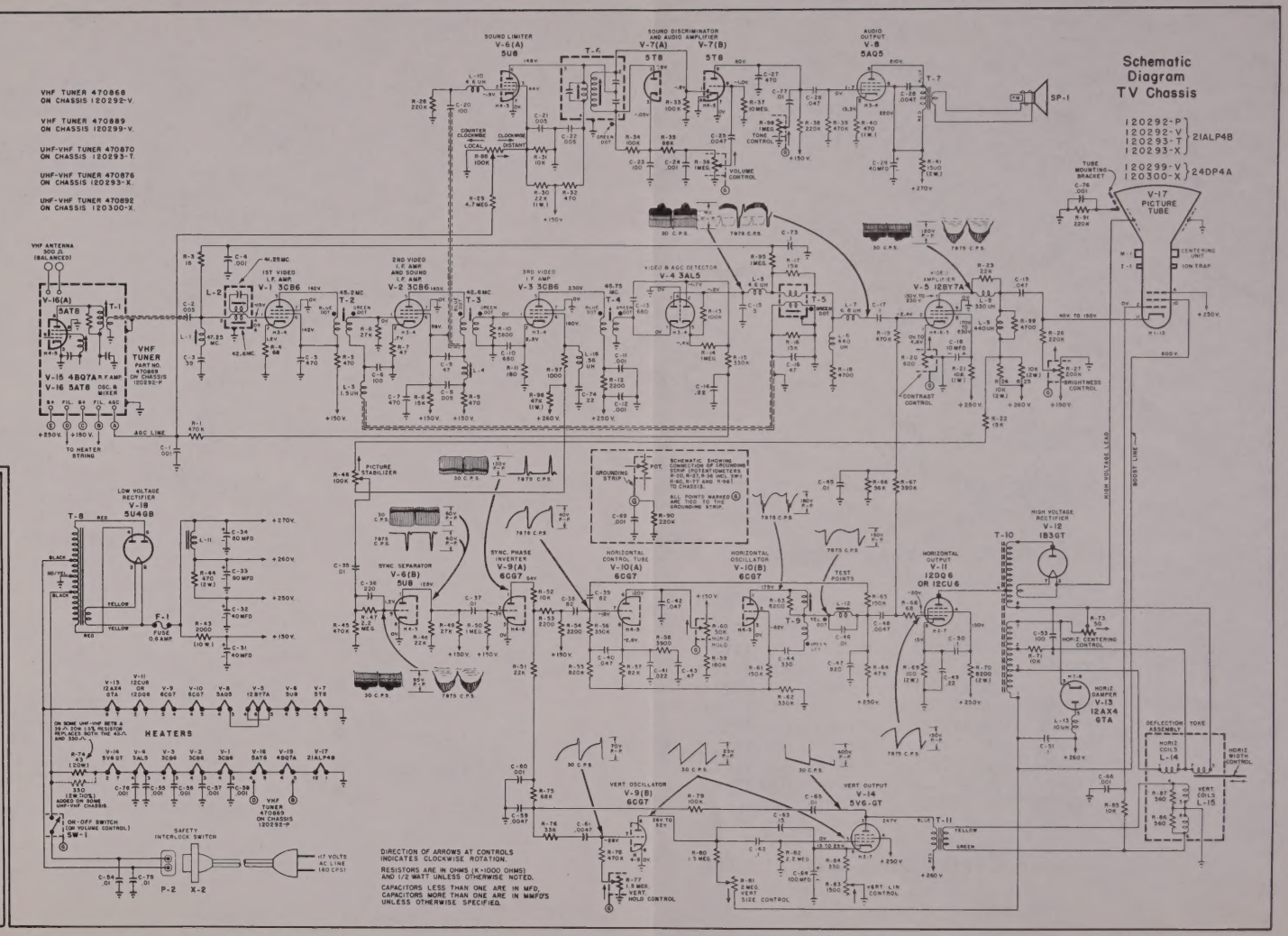
1176	(Ch. 120292-P, -V)
1177	(Ch. 120293-T, -X)
1178	(Ch. 120292-P, -V)
1179	(Ch. 120293-T, -X)
1180	(Ch. 120292-P, -V)
1181	(Ch. 120293-T, -X)
1186	(Ch. 120299-V)
1187	(Ch. 120300-X)
1188	(Ch. 120299-V)
1189	(Ch. 120300-X)

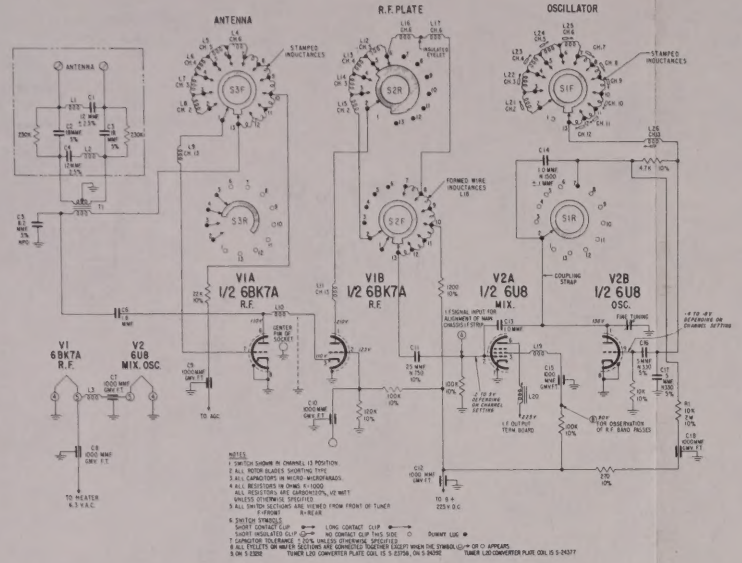
Schematic Courtesy Emerson
Radio And Phonograph Corp.

PHILCO MODEL

C-5690 (HR)

Schematic Courtesy Philco Corporation

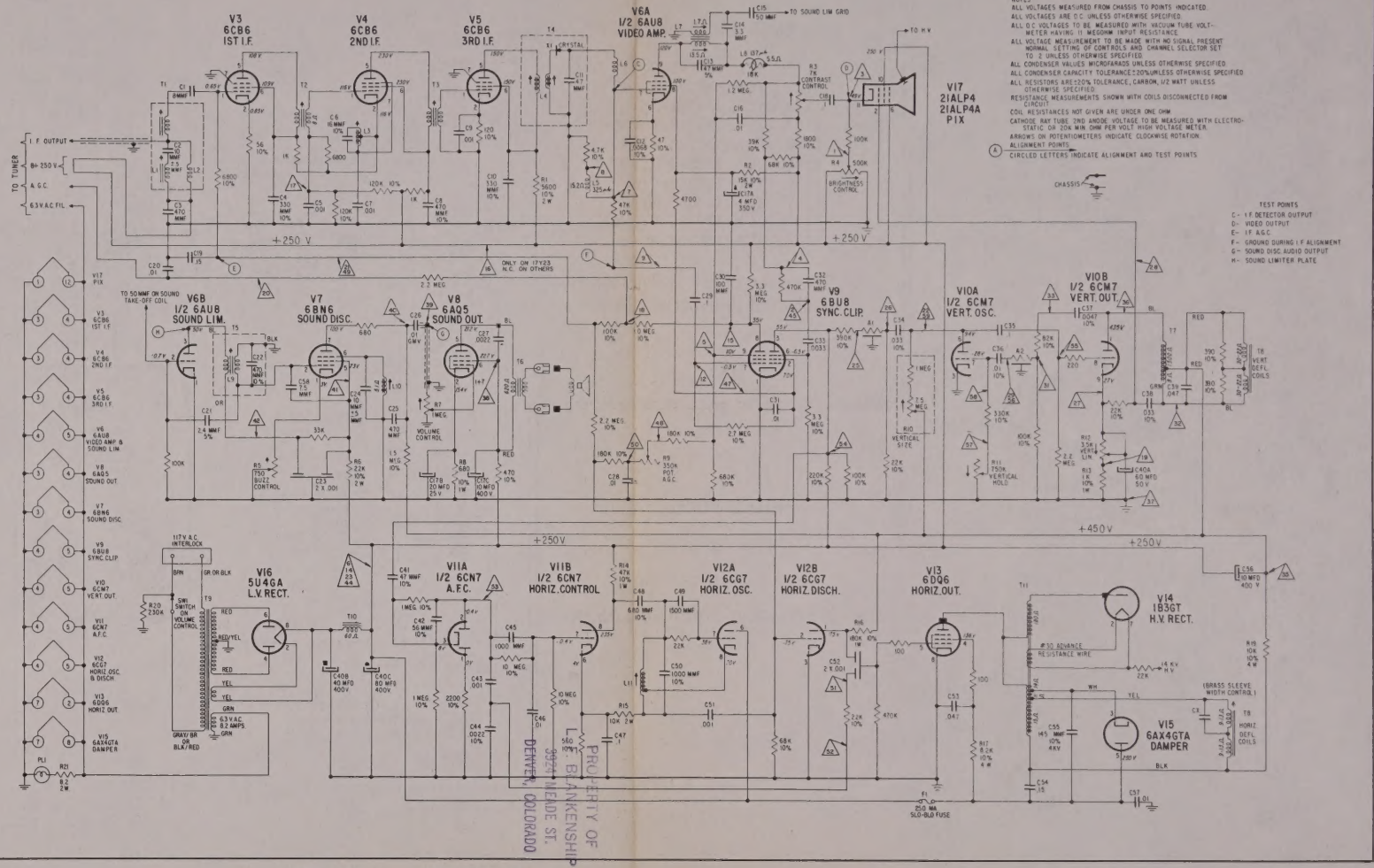




ZENITH MODELS

Y2220R	(Ch. 17Y20)	Y2250	(Ch. 17Y22)
Y2222C	(Ch. 17Y20)	Y2250E	(Ch. 17Y22)
Y2222E	(Ch. 17Y20)	Y2250R	(Ch. 17Y22)
Y2222R	(Ch. 17Y20)	Y2258E	(Ch. 17Y22)
Y2222Y	(Ch. 17Y20)	Y2258H	(Ch. 17Y22)
Y2232E	(Ch. 17Y22)	Y2258R	(Ch. 17Y22)
Y2232R	(Ch. 17Y22)	Y2281E	(Ch. 17Y22)
Y2247E	(Ch. 17Y22)	Y2281R	(Ch. 17Y22)
Y2247R	(Ch. 17Y22)		

Schematic Courtesy Zenith Radio Corporation



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